



SERVICE MANUAL

Ténéré 2024



YAMAHA



SERVICE MANUAL

BASIC INFORMATION

IMPORTANT

This manual was produced by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics.





This manual contains only basic instructions that must be observed during servicing. Refer to the applicable service manual for detailed information on checking, adjustment, and replacement.

TIP

Designs and specifications are subject to change without notice.

IMPORTANT MANUAL INFORMATION

Particularly important information is distinguished in this manual by the following notations.

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
	A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.
	A TIP provides key information to make procedures easier or clearer.


















**BASIC INFORMATION
SERVICE MANUAL
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SYMBOLS

The following symbols are used in this manual for easier understanding.

TIP

The following symbols are not relevant to every vehicle.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Serviceable with engine mounted		Molybdenum disulfide oil
	Filling fluid		Gear oil
	Lubricant		Brake fluid
	Special tool		Wheel bearing grease
	Tightening torque		Lithium-soap-based grease
	Wear limit, clearance		Molybdenum disulfide grease
	Engine speed		Silicone grease
	Electrical data		Apply locking agent (LOCTITE®).
	Engine oil	New	Replace the part with a new one.

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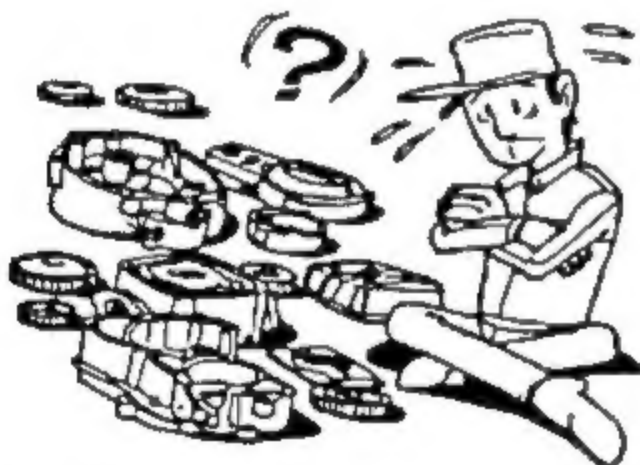
IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.



2. Use only the proper tools and cleaning equipment. Refer to "SPECIAL TOOLS" in the applicable service manual.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.



4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

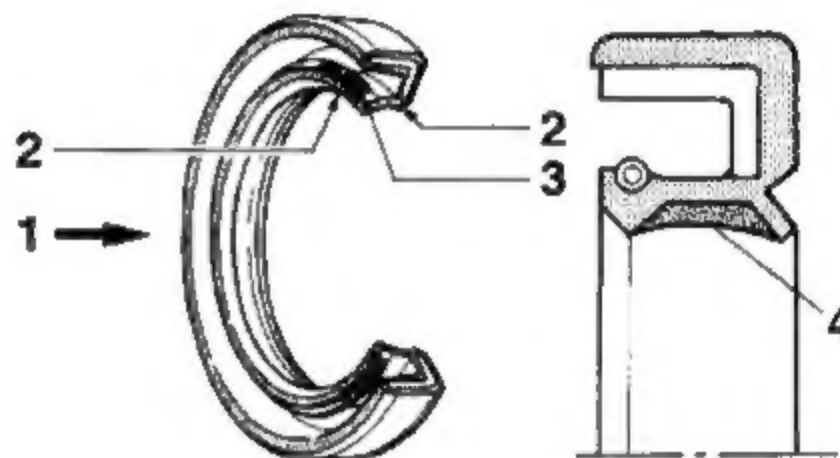
REPLACEMENT PARTS

Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



GASKETS, OIL SEALS AND O-RINGS

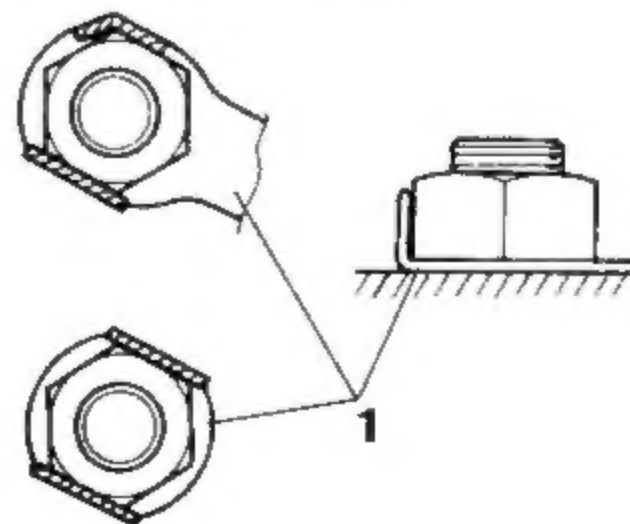
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



1. Oil
2. Lip
3. Spring
4. Grease

LOCK WASHERS/PLATES AND COTTER PINS

After removal, replace all lock washers/plates "1" and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.



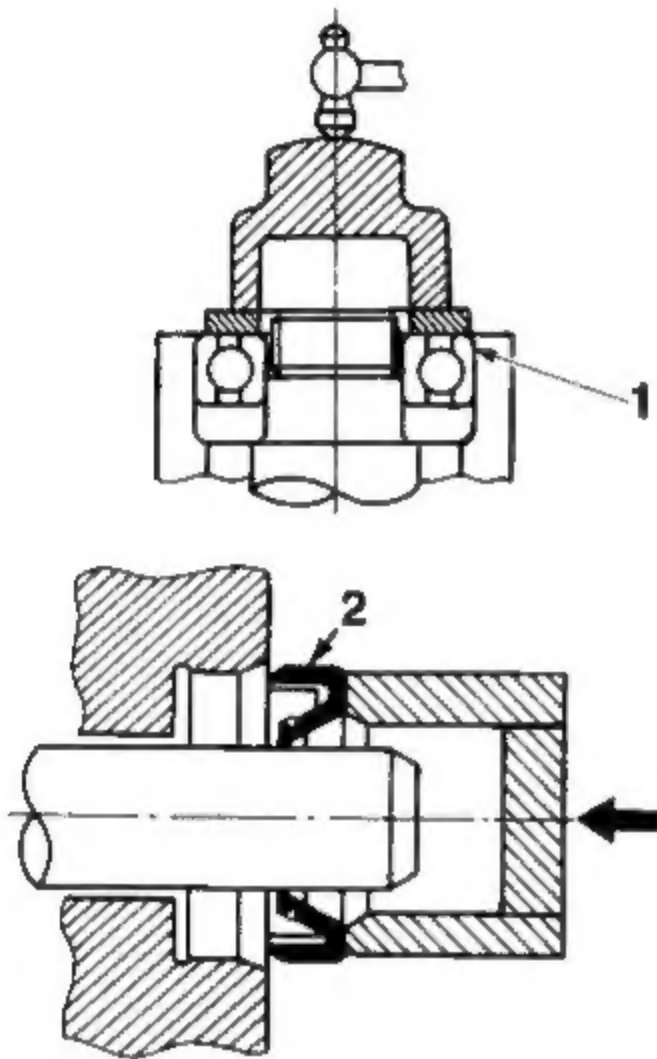
BEARINGS AND OIL SEALS

Install bearings "1" and oil seals "2" so that the manufacturer marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

ECA13300

NOTICE

Do not spin the bearing with compressed air because this will damage the bearing surfaces.



REASSEMBLY OF PARTS USING LOCKING AGENT (LOCTITE®)

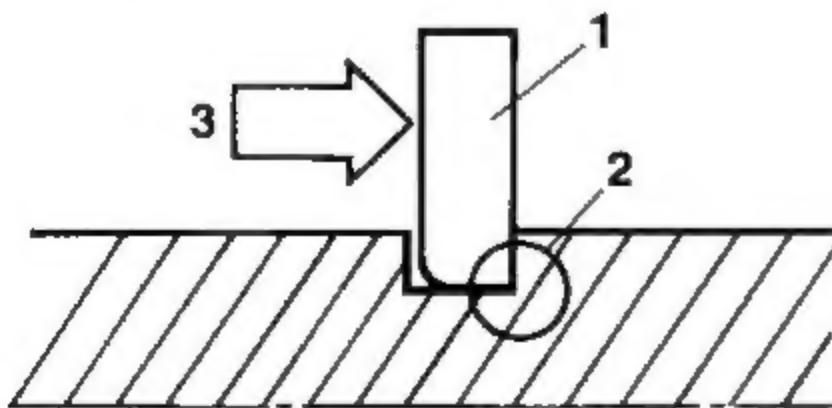
Before reassembling screws, bolts, and nuts, or other parts, using locking agent (LOCTITE®), remove all the old locking agent, and then apply new locking agent and reassemble the parts. Also, a specified amount of time is required for the locking agent to cure.

RUBBER PARTS

Check rubber parts for deterioration during inspection. Some of the rubber parts are sensitive to gasoline, flammable oil, grease, etc. Do not allow any items other than the specified one to contact the parts.

CIRCLIPS

Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip "1", make sure the sharp-edged corner "2" is positioned opposite the thrust "3" that the circlip receives.



BASIC SERVICE INFORMATION

QUICK FASTENERS

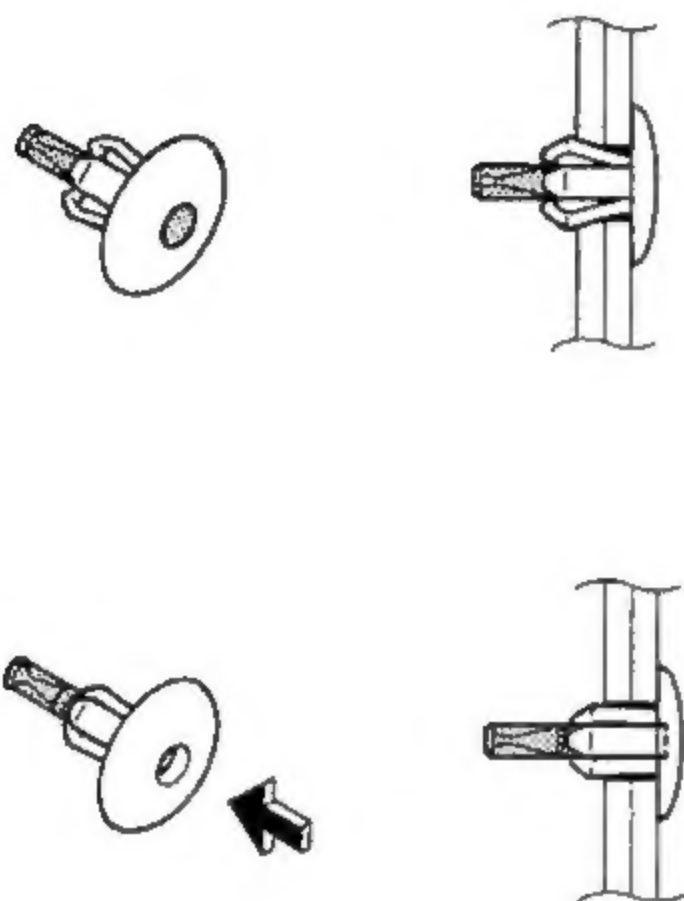
Rivet type

1. Remove:

- Quick fastener

TIP

To remove the quick fastener, push its pin with a screwdriver, then pull the fastener out.

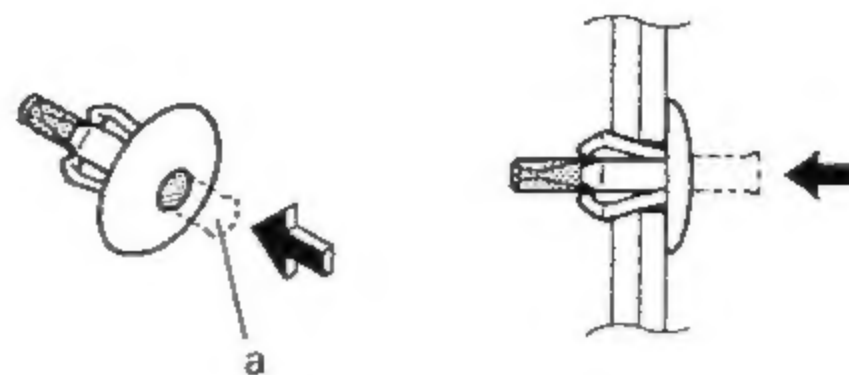
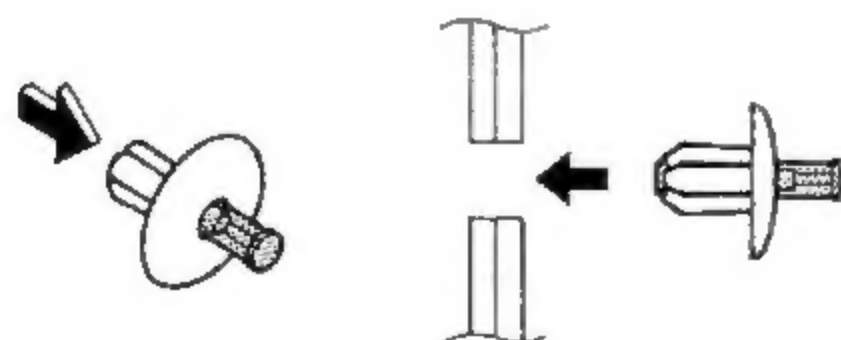


2. Install:

- Quick fastener

TIP

To install the quick fastener, push its pin so that it protrudes from the fastener head, then insert the fastener into the part to be secured and push the pin "a" in with a screwdriver. Make sure that the pin is flush with the fastener's head.



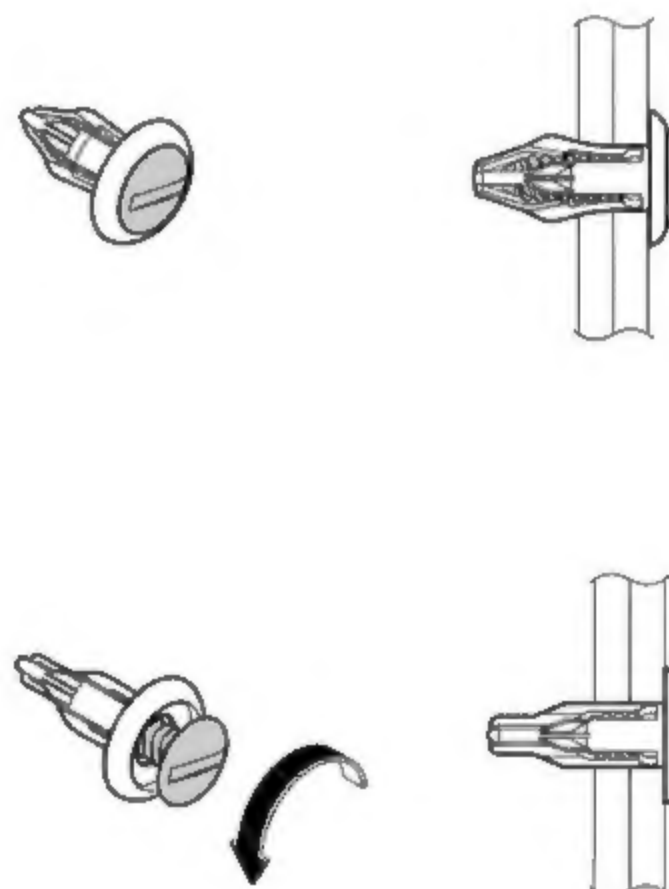
Screw type 1

1. Remove:

- Quick fastener

TIP

To remove the quick fastener, loosen the screw with a screwdriver, then pull the fastener out.

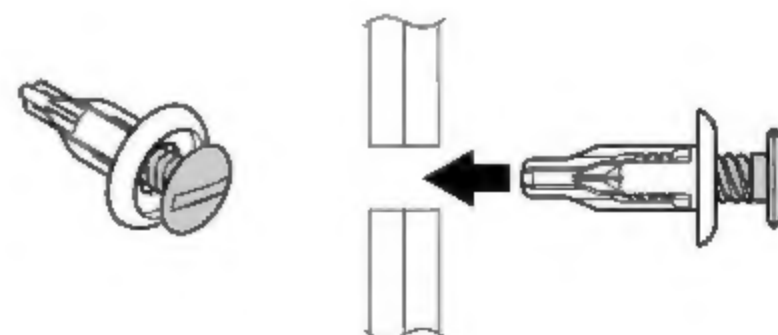


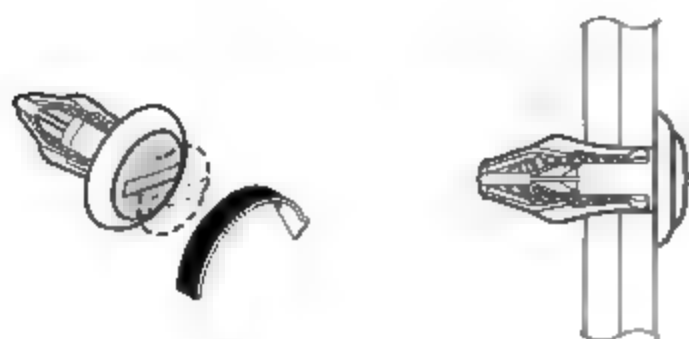
2. Install:

- Quick fastener

TIP

To install the quick fastener, insert the fastener into the part to be secured and tighten the screw.





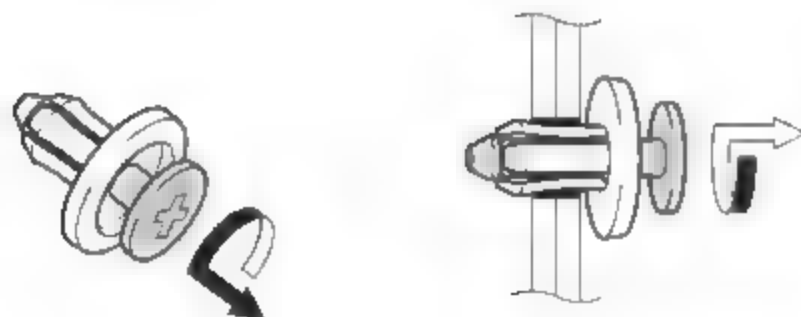
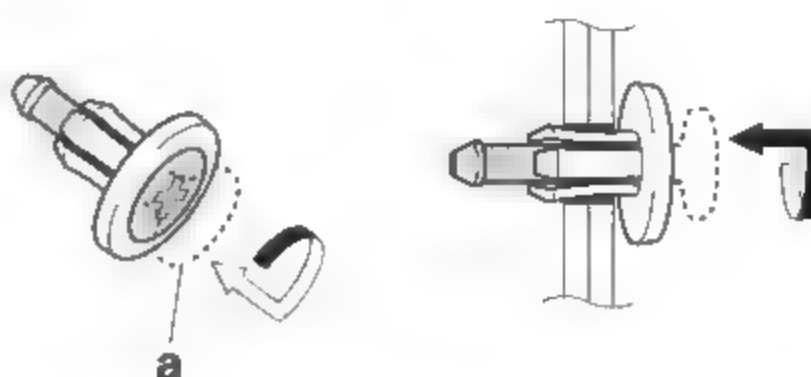
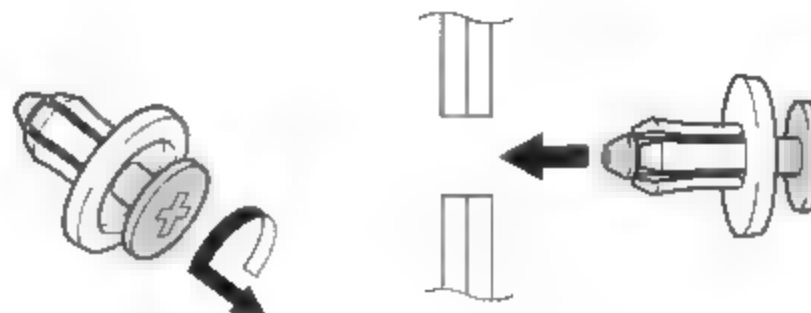
Screw type 2

1. Remove:

- Quick fastener

TIP

To remove the quick fastener, loosen the screw with a screwdriver, then pull the fastener out.



2. Install:

- Quick fastener

TIP

To install the quick fastener, insert the fastener into the part to be secured and tighten the screw "a".

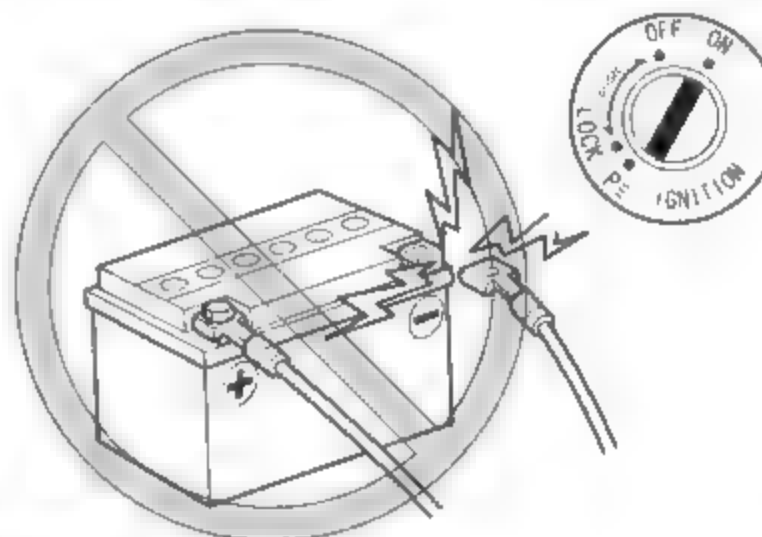
ELECTRICAL SYSTEM

Electrical parts handling

ECA16800

NOTICE

Never disconnect a battery lead while the engine is running; otherwise, the electrical components could be damaged.

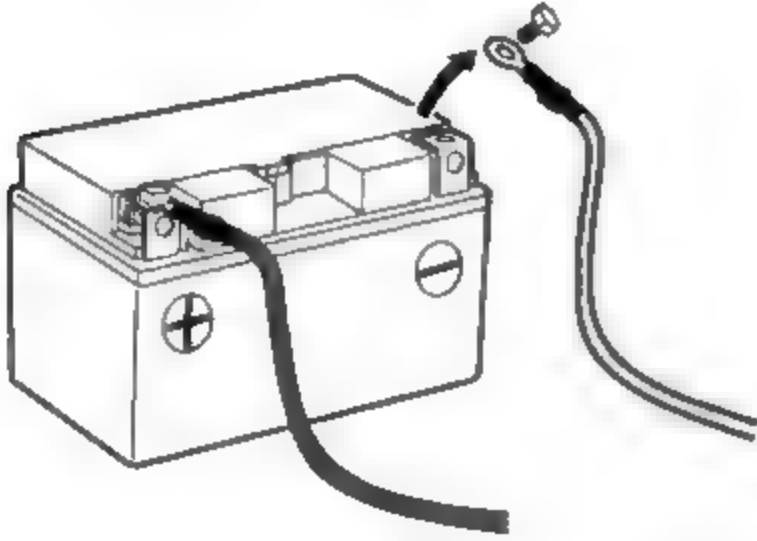


ECA16751

NOTICE

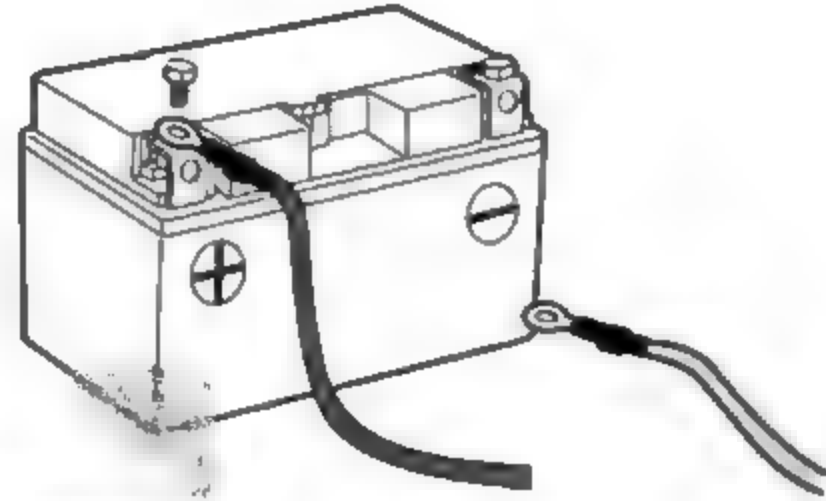
When disconnecting the battery leads from the battery, be sure to disconnect the negative battery lead first, then the positive battery lead. If the positive battery lead is disconnected first and a tool or similar item contacts the vehicle, a spark could be generated, which is extremely dangerous.

BASIC SERVICE INFORMATION



TIP

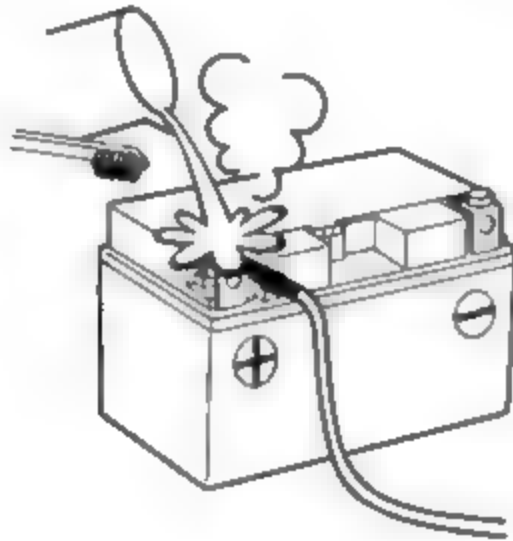
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



ECA16610

NOTICE

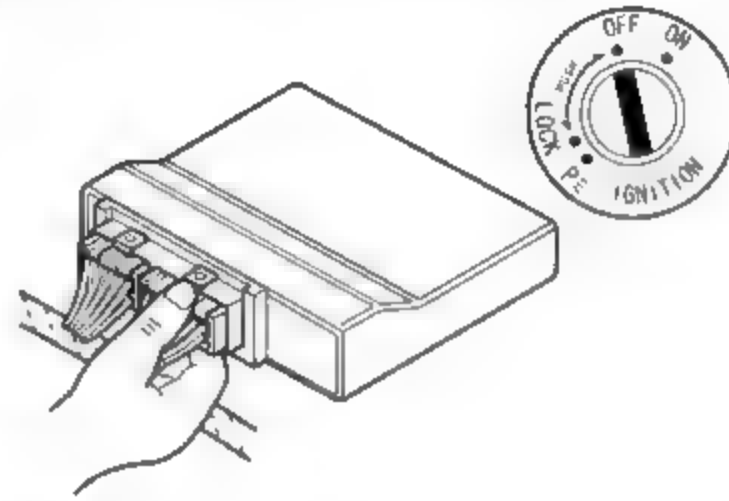
Turn the main switch to “OFF” before disconnecting or connecting an electrical component.



ECA16760

NOTICE

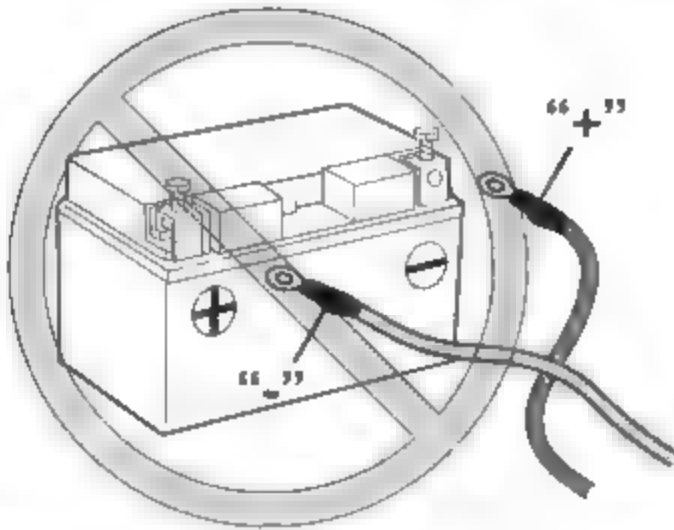
Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



ECA16620

NOTICE

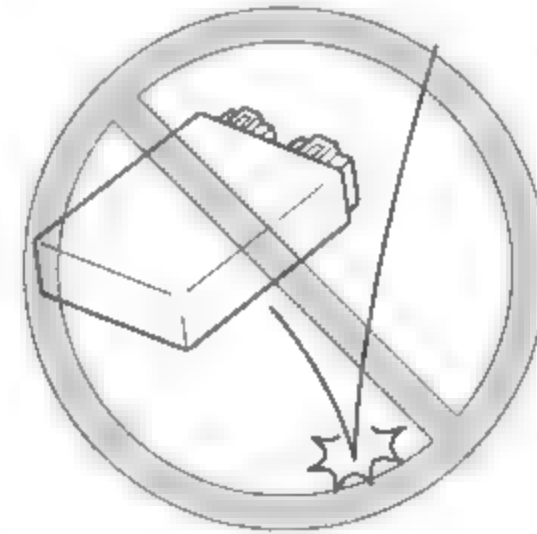
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16771

NOTICE

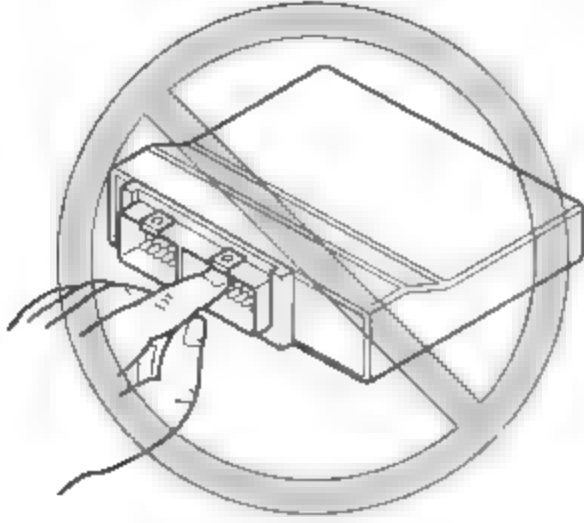
When connecting the battery leads to the battery, be sure to connect the positive battery lead first, then the negative battery lead. If the negative battery lead is connected first and a tool or similar item contacts the vehicle while the positive battery lead is being connected, a spark could be generated, which is extremely dangerous.



ECA16630

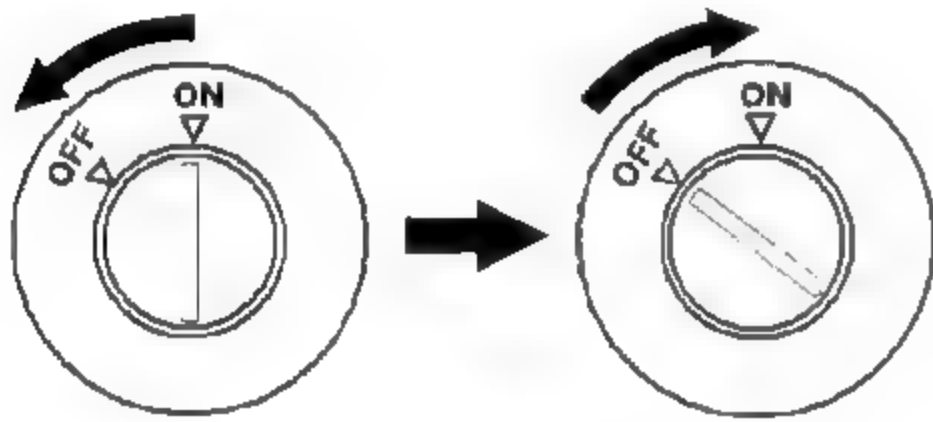
NOTICE

Electrical components are very sensitive to and can be damaged by static electricity. Therefore, never touch the terminals and be sure to keep the contacts clean.



TIP

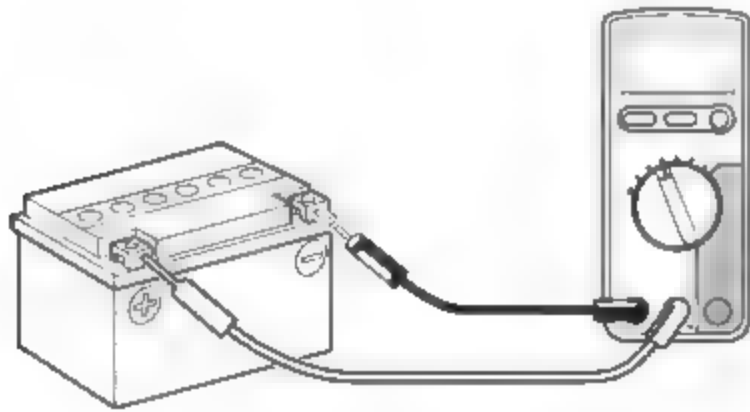
When resetting the ECU by turning the main switch to "OFF", be sure to wait approximately 5 seconds before turning the main switch back to "ON".



Checking the electrical system

TIP

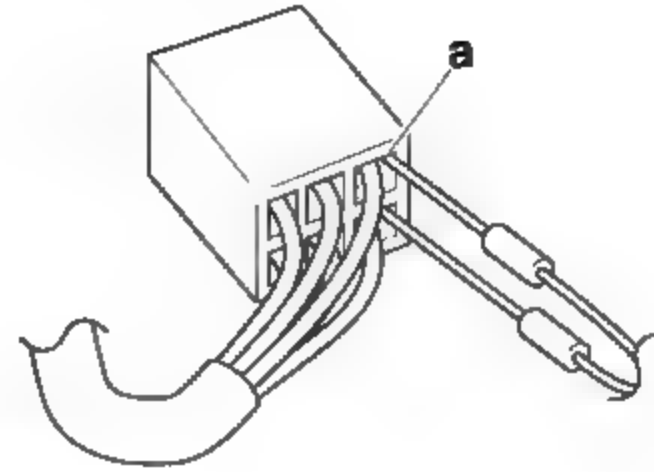
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

NOTICE

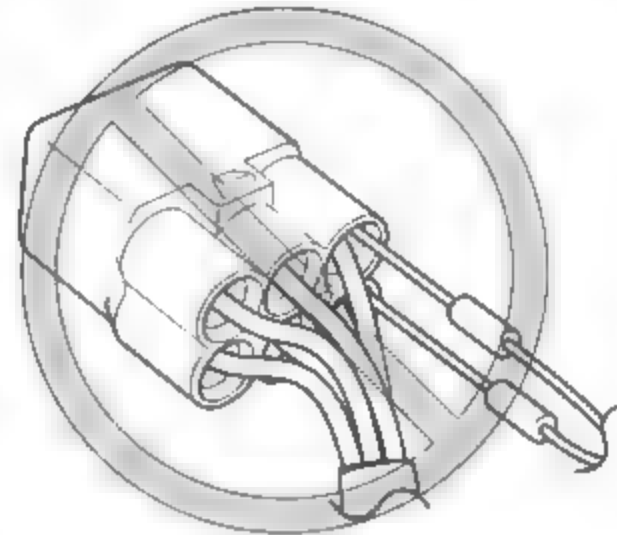
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



ECA16640

NOTICE

For waterproof couplers, never insert the tester probes directly into the coupler. When performing any checks using a waterproof coupler, use the specified test harness or a suitable commercially available test harness.



Checking the connections

Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:

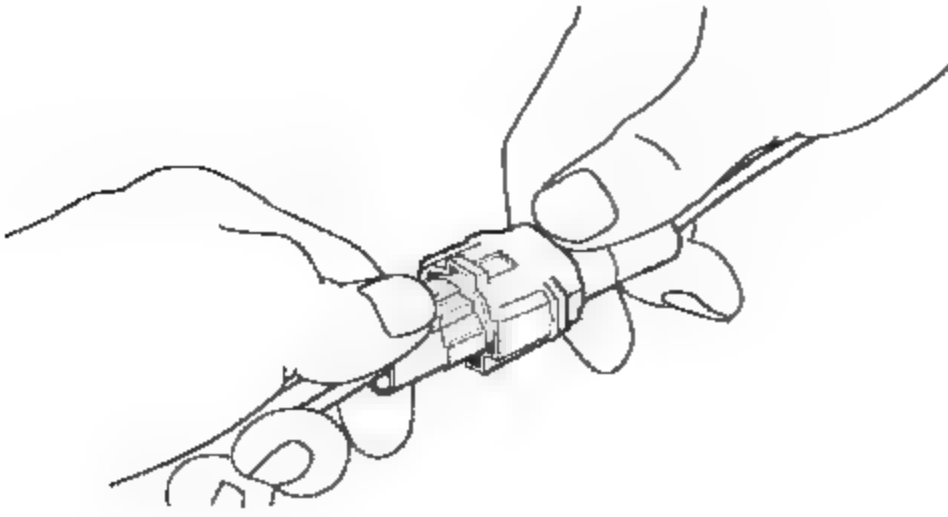
- Lead
- Coupler
- Connector

ECA16780

NOTICE

- When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.
- There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.

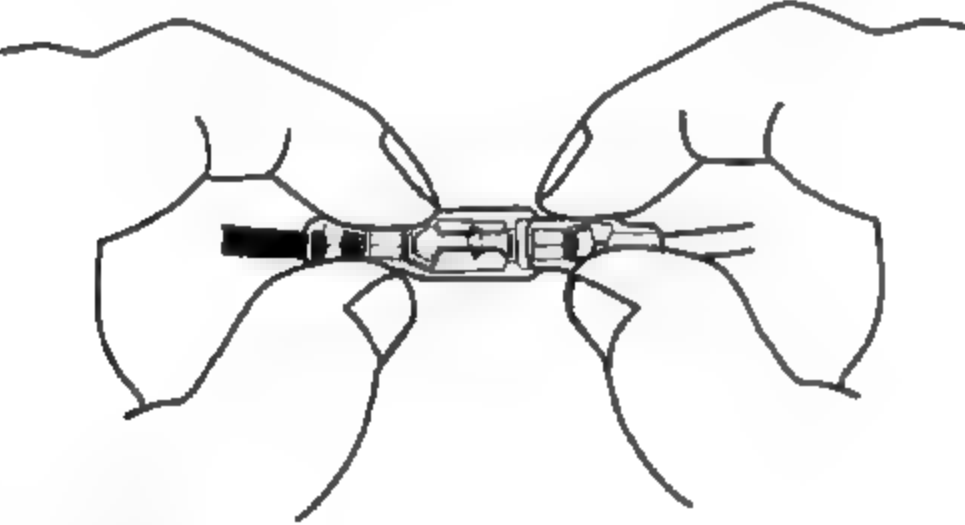
BASIC SERVICE INFORMATION



ECA16790

NOTICE

When disconnecting a connector, do not pull the leads. Hold both sections of the connector securely, and then disconnect the connector.

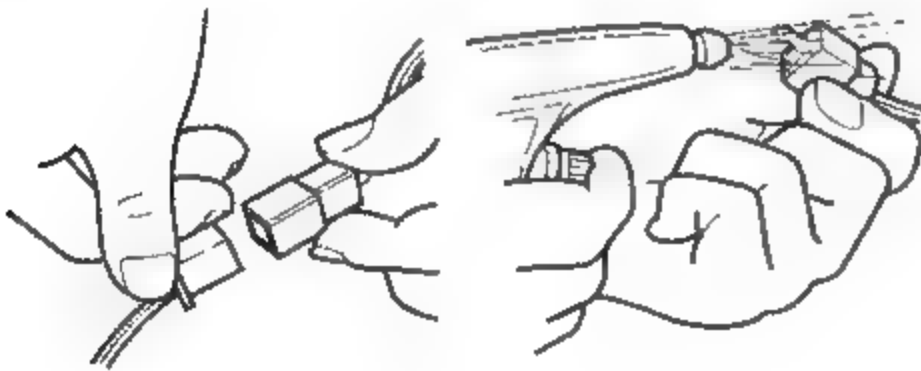


2. Check:

- Lead
- Coupler
- Connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.



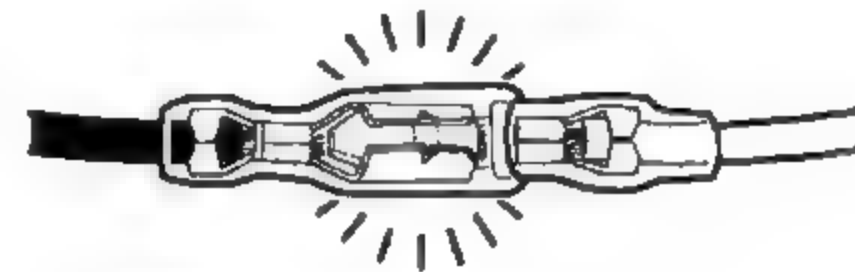
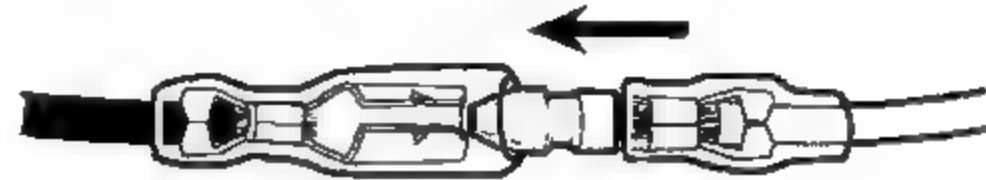
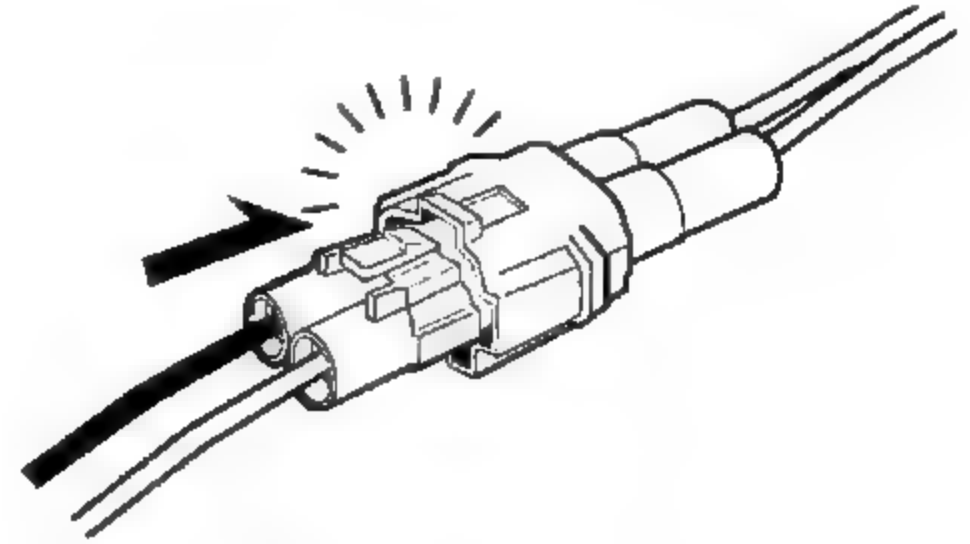
3. Connect:

- Lead
- Coupler
- Connector

TIP

- When connecting a coupler or connector, push both sections of the coupler or connector together until they are connected securely.

- Make sure all connections are tight.



4. Check:

- Continuity
(with the digital circuit tester (CD732))



Digital circuit tester (CD732)

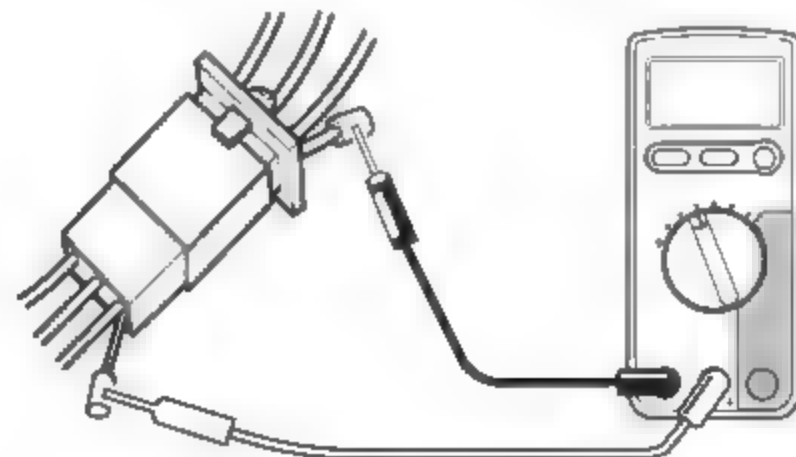
90890-03243

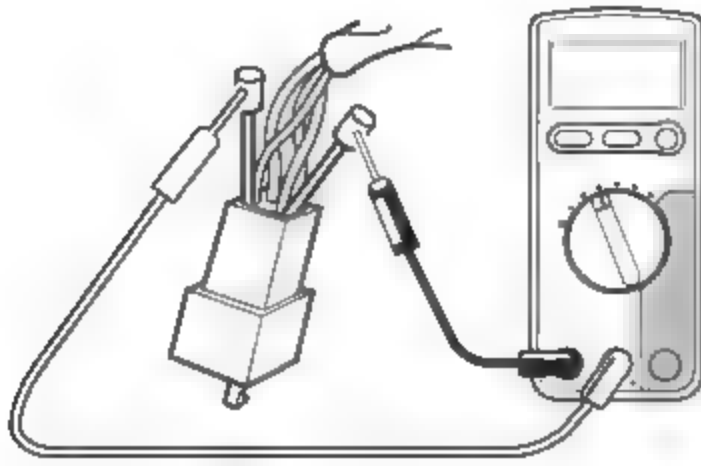
Model 88 Multimeter with tachometer

YU-A1927

TIP

- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (4).
- As a quick remedy, use a contact revitalizer available at most part stores.






5. Check:
- Resistance



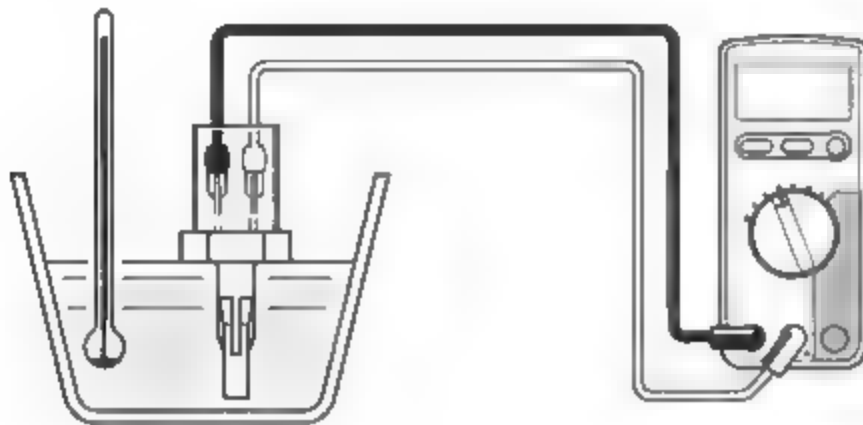
Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

TIP

The resistance values shown were obtained at the standard measuring temperature of 20 °C (68 °F). If the measuring temperature is not 20 °C (68 °F), the specified measuring conditions will be shown.

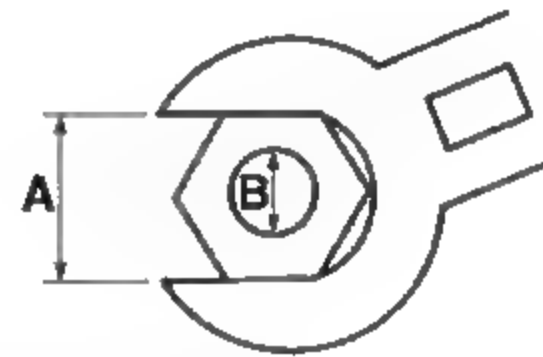


Intake air temperature sensor resistance
5.40–6.60 kΩ at 0 °C (32 °F)
290–390 Ω at 80 °C (176 °F)



GENERAL TIGHTENING TORQUE SPECIFICATIONS

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Refer to the applicable service manual for tightening torque specifications of special components or assemblies. To avoid warpage, tighten multi-fastener assemblies in a crisscross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.



- A. Distance between flats
 B. Outside thread diameter

A (nut)	B (bolt)	General tightening torques		
		N·m	kgf·m	lb·ft
10 mm	6 mm	6	0.6	4.4
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3	22
17 mm	12 mm	55	5.5	41
19 mm	14 mm	85	8.5	63
22 mm	16 mm	130	13	95.9

ADJUSTING THE WHEEL STATIC BALANCE

TIP

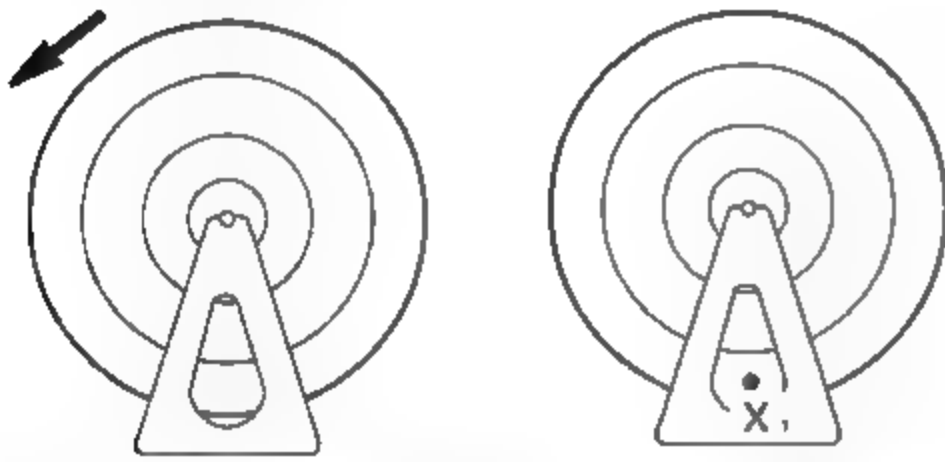
- After replacing the tire, wheel or both, the wheel static balance should be adjusted.
- Adjust the wheel static balance with the brake disc installed.

1. Remove:
 - Balancing weight(s)
2. Find:
 - Wheel's heavy spot

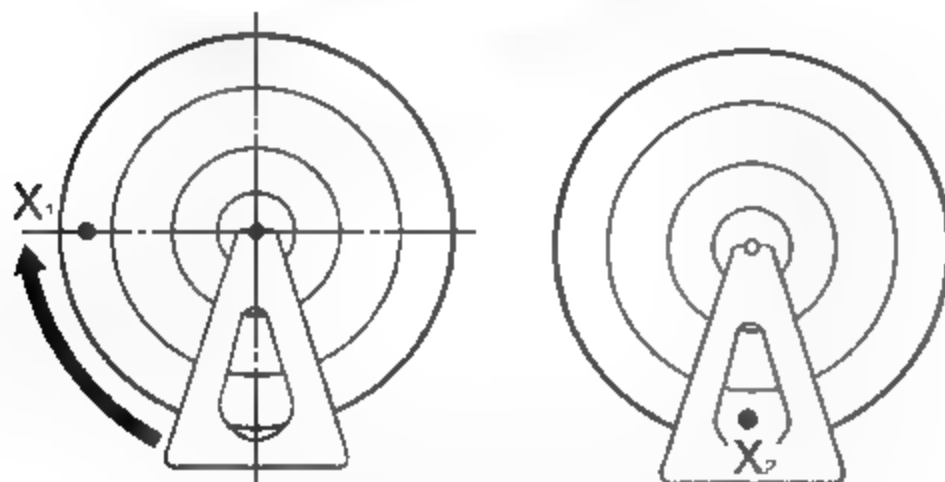
TIP

Place the wheel on a suitable balancing stand.

- a. Spin the wheel.
- b. When the wheel stops, put an "X₁" mark at the bottom of the wheel.



- c. Turn the wheel 90° so that the "X₁" mark is positioned as shown.
- d. Release the wheel.
- e. When the wheel stops, put an "X₂" mark at the bottom of the wheel.



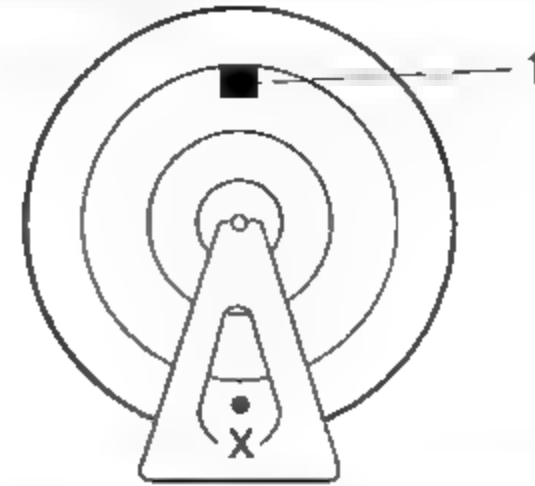
- f. Repeat steps (c) through (e) several times until all the marks come to rest at the same spot.
- g. The spot where all the marks come to rest is the wheel's heavy spot "X".

3. Adjust:

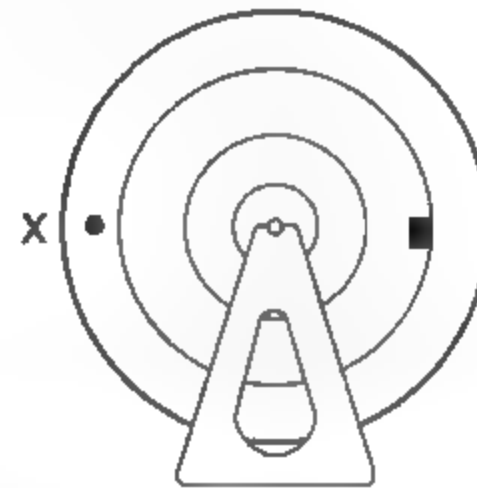
- Wheel static balance
- a. Install a balancing weight "1" onto the rim exactly opposite the heavy spot "X".

TIP

Start with the lightest weight.



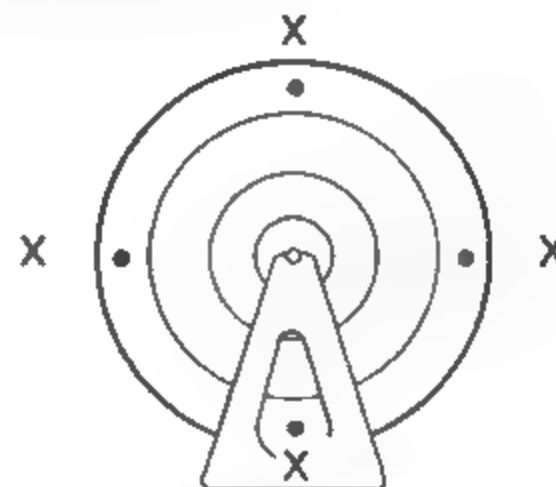
- b. Turn the wheel 90° so that the heavy spot is positioned as shown.



- c. If the heavy spot does not stay in that position, install a heavier weight.
- d. Repeat steps (b) and (c) until the wheel is balanced.

4. Check:

- Wheel static balance
- a. Turn the wheel and make sure it stays at each position shown.



- b. If the wheel does not remain stationary at all of the positions, rebalance it.

CHECKING THE SWITCHES

Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

ECA14371

NOTICE

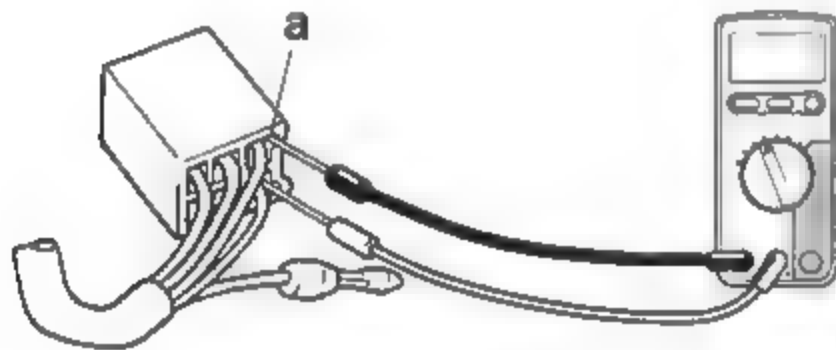
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

TIP

- Before checking for continuity, set the digital circuit tester to the "Ω" range.
- When checking for continuity, switch back and forth between the switch positions a few times.



The terminal connections for switches (e.g., main switch, engine stop switch) are indicated in an illustration as shown in the following example.

The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row in the switch illustration.

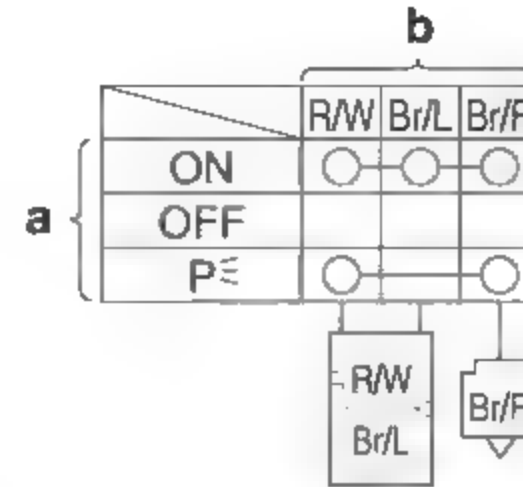
TIP

"○—○" indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

The example illustration below shows that:

There is continuity between red/white, brown/blue and brown/red when the switch is set to "ON".

There is continuity between red/white and brown/red when the switch is set to "P".



CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

Damage/wear → Repair or replace the bulb, bulb socket or both.

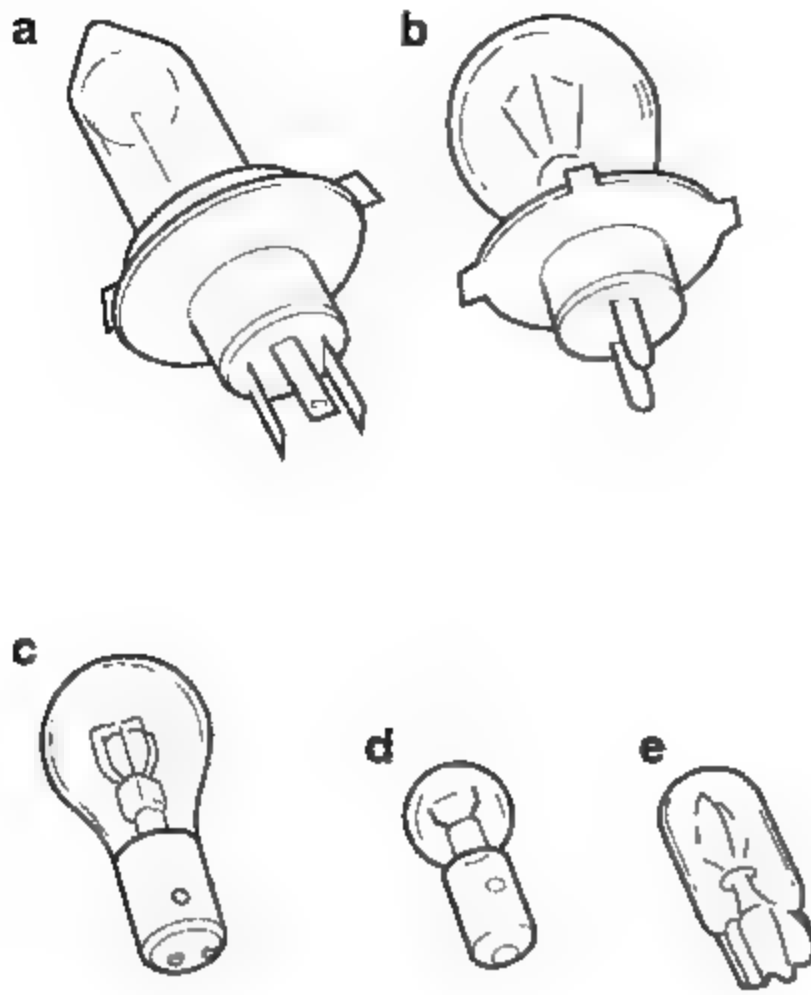
Improperly connected → Properly connect.

No continuity → Repair or replace the bulb, bulb socket or both.

Types of bulbs

The bulbs used on this vehicle are shown in the following illustration.

- Bulbs "a" and "b" are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulbs "c" are used for turn signal lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs "d" and "e" are used for license plate and auxiliary lights and can be removed from their respective sockets by carefully pulling them out.



Checking the condition of the bulbs

The following procedure applies to all of the bulbs.

1. Remove:

- Bulb

EWA13320

WARNING

Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.

ECA14381

NOTICE

- Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.
- Avoid touching the glass part of a headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

2. Check:

- Bulb (for continuity)
(with the digital circuit tester)
No continuity → Replace.

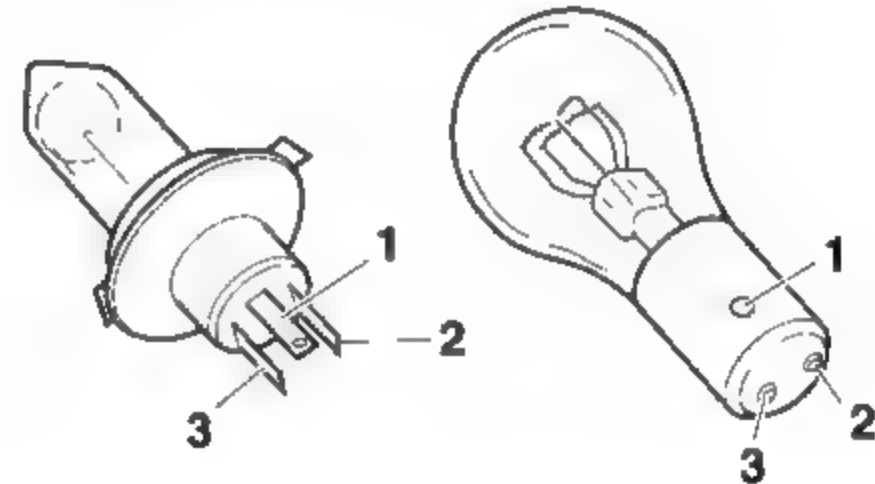


Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

TIP

Before checking for continuity, set the digital circuit tester to the "Ω" range.

- Connect the positive tester probe to terminal "1" and the negative tester probe to terminal "2", and check the continuity.
- Connect the positive tester probe to terminal "1" and the negative tester probe to terminal "3", and check the continuity.
- If either of the readings indicate no continuity, replace the bulb.



Checking the condition of the bulb sockets

The following procedure applies to all of the bulb sockets.

1. Check:

- Bulb socket (for continuity)
(with the digital circuit tester)
No continuity → Replace.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

TIP

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

- Install a good bulb into the bulb socket.
- Connect the digital circuit tester probes to the respective leads of the bulb socket.

- c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

CHECKING AND CHARGING THE BATTERY

FWA13290

WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- Wear protective eye gear when handling or working near batteries.
- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).
- **DO NOT SMOKE** when charging or handling batteries.
- **KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**
- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.

FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

- Skin — Wash with water.
- Eyes — Flush with water for 15 minutes and get immediate medical attention.

INTERNAL

- Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.

VRLA type battery

ECA13661

NOTICE

- This is a VRLA (Valve Regulated Lead Acid) battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
- Charging time, charging amperage and charging voltage for a VRLA (Valve Regulated Lead Acid) battery are different from those of conventional batteries. The VRLA (Valve Regulated Lead Acid) battery should be charged according to the appropriate charging method. If the battery is overcharged, the electrolyte level will drop con-

siderably. Therefore, take special care when charging the battery.

TIP

Since VRLA (Valve Regulated Lead Acid) batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Check:

- Battery charge
 - a. Connect a digital circuit tester to the battery terminals.

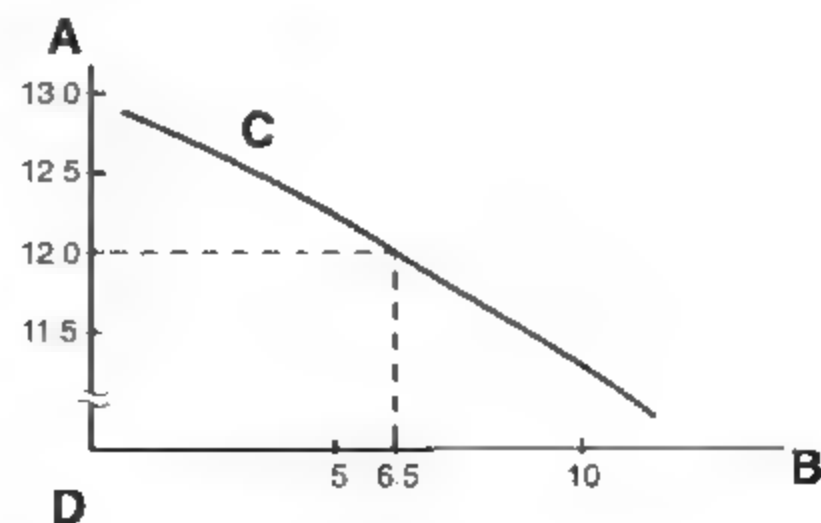
- Positive tester probe → positive battery terminal
- Negative tester probe → negative battery terminal

TIP

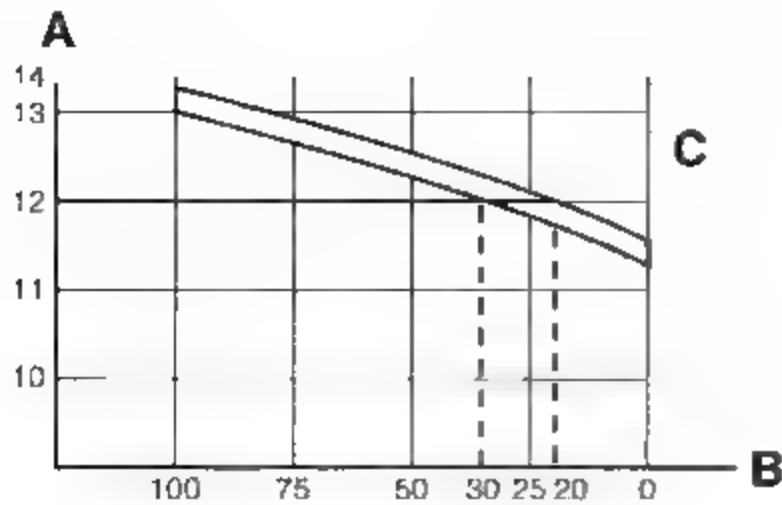
- The charge state of a VRLA (Valve Regulated Lead Acid) battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

- b. Check the charge of the battery, as shown in the charts and the following example.

Example
 Open-circuit voltage = 12.0 V
 Charging time = 6.5 hours
 Charge of the battery = 20–30%



- A. Open-circuit voltage (V)
- B. Charging time (hours)
- C. Relationship between the open-circuit voltage and the charging time at 20 °C (68 °F)
- D. These values vary with the temperature, the condition of the battery plates, and the electrolyte level.



- A. Open-circuit voltage (V)
 B. Charging condition of the battery (%)
 C. Ambient temperature 20 °C (68 °F)

2. Charge:

- Battery
 (refer to the appropriate charging method)

FWA13300



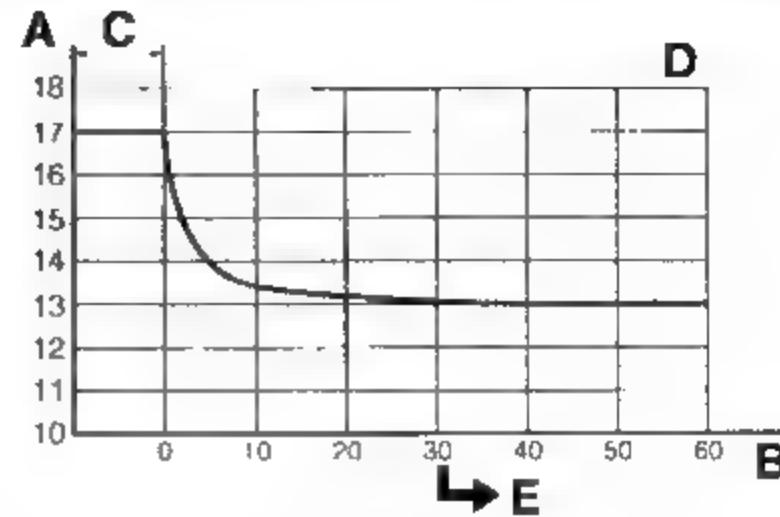
Do not quick charge a battery.

ECA13871

NOTICE

- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative battery lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of a VRLA (Valve Reg-

ulated Lead Acid) battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



- A. Open-circuit voltage (V)
 B. Time (minutes)
 C. Charging
 D. Ambient temperature 20 °C (68 °F)
 E. Check the open-circuit voltage.

Charging method using a variable-current (voltage) charger

- Measure the open-circuit voltage prior to charging.

TIP

Voltage should be measured 30 minutes after the engine is stopped.

- Connect a charger and ammeter to the battery and start charging.

TIP

Set the charging voltage to 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

- Make sure that the current is higher than the standard charging current written on the battery.

TIP

If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

- Standard charging current is reached
 Battery is good.
- Standard charging current is not reached
 Replace the battery.

- Adjust the voltage so that the current is at the standard charging level.

- e. Set the time according to the charging time suitable for the open-circuit voltage.
- f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.
- g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

Charging method using a constant voltage charger

- a. Measure the open-circuit voltage prior to charging.

TIP

Voltage should be measured 30 minutes after the engine is stopped.

- b. Connect a charger and ammeter to the battery and start charging.
- c. Make sure that the current is higher than the standard charging current written on the battery.

TIP

If the current is lower than the standard charging current written on the battery, this type of battery charger cannot charge the VRLA (Valve Regulated Lead Acid) battery. A variable voltage charger is recommended.

- d. Charge the battery until the battery's charging voltage is 15 V.

TIP

Set the charging time at 20 hours (maximum).

- e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

Open type battery

1. Check:

- Electrolyte level

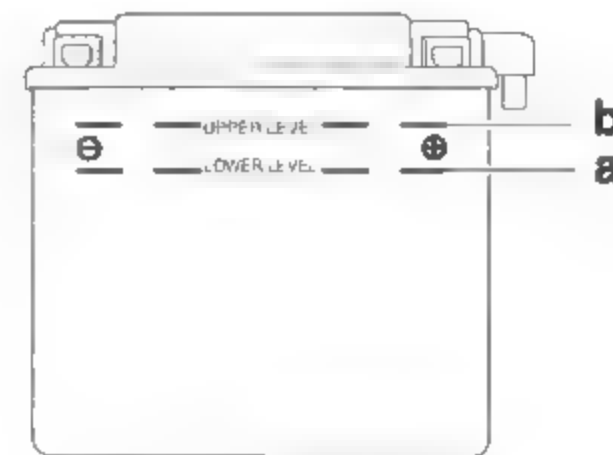
The electrolyte level should be between the minimum level mark "a" and the maximum level mark "b".

Below the minimum level mark → Add distilled water to the proper level.

ECA13610

NOTICE

Add only distilled water. Tap water contains minerals which are harmful to the battery.



2. Check:

- Specific gravity

Less than 1.28 → Recharge the battery.



Specific gravity
1.28

3. Charge:

- Battery

Battery charging amperage and time
Refer to "ELECTRICAL SPECIFICATIONS"
in the applicable service manual.

EWA13300

WARNING

Do not quick charge a battery.

ECA13620

NOTICE

- Loosen the battery sealing caps.
- Make sure the battery breather hose and battery vent are free of obstructions.
- To ensure maximum performance, always charge a new battery before using it.
- Do not use a high-rate battery charger. They force a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.

- When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!

TIP

Replace the battery whenever:

- battery voltage does not rise to specification or bubbles fail to rise during charging,
- sulphation of one or more battery cells occurs (as indicated by the battery plates turning white or material accumulating in the bottom of the battery cell),
- specific gravity readings after a long, slow charge indicate that one battery cell's charge is lower than the rest,
- warpage or buckling of the battery plates or insulators is evident.

4. Check:

- Battery breather hose and battery vent
Obstruction → Clean.
Damage → Replace.

TROUBLESHOOTING

GENERAL INFORMATION

TIP

Troubleshooting information provided here does not cover all the trouble symptoms, possible causes, and remedial actions. Some items may not apply depending on the model. Use this information as a guide and quick reference matrix when performing basic troubleshooting. Refer to the applicable Service manual for detailed information on checking, adjustment, and replacement.

TROUBLESHOOTING OF ENGINE (fault code not detected)

TIP

If a fault code is detected, refer to the "ECU SELF-DIAGNOSTIC FUNCTION" under "FUEL INJECTION SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.

Engine does not crank.

Symptom	Possible cause	Actions
Starter motor does not operate	Refer to "TROUBLESHOOTING" under "ELECTRIC STARTING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	
Starter motor operates, but the engine does not crank.	Starter clutch malfunction	Replace the starter clutch.
	Improper oil grade (starter clutch slipping)	Change to recommended engine oil.
	Stuck piston or seized crankshaft	Disassemble and check the engine. Replace defective parts.

Engine will not start or is difficult to start, but it cranks (fuel injection models).

Symptom	Possible cause	Actions
Spark plug does not produce a spark	Refer to "TROUBLESHOOTING" under "IGNITION SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	
Fuel not supplied	—	Measure the fuel pressure.
	Empty fuel tank	Fill the fuel tank with fuel.
	Clogged fuel tank cap breather hole	Clean the fuel tank cap.
	Clogged or damaged fuel hose	Clean, repair, or replace the fuel hose.
	Fuel leakage	Check the fuel passage. Repair or replace as necessary.
	Clogged fuel pump	Clean or replace the fuel pump.
	Cracks or damage in fuel pump	Replace the fuel pump.
	Fuel pump malfunction	Refer to "TROUBLESHOOTING" under "FUEL PUMP SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.
	Failed or clogged fuel injector	Replace the fuel injector.
	ECU failure	Replace the ECU.
—	Water or foreign material in fuel, degraded fuel	Change fuel.

TROUBLESHOOTING

Symptom	Possible cause	Actions
Compression pressure is low	—	Measure the compression pressure.
	Loose spark plug	Tighten the spark plug to the specified torque.
	Loose cylinder head or cylinder	Tighten bolts or nuts on cylinder head and cylinder to the specified torque.
	Damaged cylinder head gasket	Replace the cylinder head gasket.
	Incorrect valve timing	Adjust the valve timing.
	Incorrect valve clearance	Adjust the valve clearance.
	Worn valve guide	Replace the valve guide.
	Bent, damaged, or stuck valve	Replace the valve.
	Poor contact between valve and valve seat	Reface the valve-to-valve-seat contact.
	Fatigued or broken valve spring	Replace the valve spring.
	Worn, damaged, or stuck piston ring	Replace the piston and piston rings as a set.
	Seized or damaged piston	Replace the piston and piston rings as a set.
	Worn or damaged cylinder bore	Replace the cylinder, piston, and piston rings as a set.

TROUBLESHOOTING

Engine will not start or is difficult to start, but it cranks (carburetor models).

Symptom	Possible cause	Actions
Spark plug does not produce a spark	Refer to "TROUBLESHOOTING" under "IGNITION SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	
Fuel not supplied	Empty fuel tank	Fill the fuel tank with fuel.
	Clogged fuel tank cap breather hole	Clean the fuel tank cap.
	Clogged or damaged fuel hose	Clean, repair, or replace the fuel hose.
	Fuel leakage	Check the fuel passage. Repair or replace as necessary.
	Clogged fuel cock strainer	Clean or replace the fuel cock strainer.
	Clogged fuel cock	Clean or replace the fuel cock.
	Cracked, damaged or worn fuel cock.	Replace the fuel cock.
	Clogged carburetor fuel passage	Clean the carburetor.
	Clogged needle valve or needle valve seat	Clean the needle valve or needle valve seat.
	Damaged float	Replace the float.
	Clogged pilot jet	Clean the pilot jet.
	Clogged starter jet	Clean the starter jet.
	Bent or damaged starter plunger	Replace the starter plunger.
	Incorrectly adjusted starter cable	Adjust the starter cable.
—	Water or foreign material in fuel, degraded fuel	Change fuel.

TROUBLESHOOTING

Symptom	Possible cause	Actions
Compression pressure is low	—	Measure the compression pressure.
	Loose spark plug	Tighten the spark plugs to the specified torque.
	Loose cylinder head or cylinder	Tighten bolts or nuts on cylinder head and cylinder to the specified torque.
	Damaged cylinder head gasket	Replace the cylinder head gasket.
	Incorrect valve timing	Adjust the valve timing.
	Incorrect valve clearance	Adjust the valve clearance.
	Worn valve guide	Replace the valve guide.
	Bent, damaged, or stuck valve	Replace the valve.
	Poor contact between valve and valve seat	Reface the valve-to-valve-seat contact.
	Fatigued or broken valve spring	Replace the valve spring.
	Worn, damaged, or stuck piston ring	Replace the piston and piston rings as a set.
	Seized or damaged piston	Replace the piston and piston rings as a set.
	Worn or damaged cylinder bore	Replace the cylinder, piston, and piston rings as a set.

Incorrect idling speed or mid-to-high speed (fuel injection models)

Symptom	Possible cause	Actions
Spark plug does not produce a spark	Incorrect spark plug gap	Adjust the spark plug gap.
	Worn or damaged spark plug	Replace the spark plug.
	Defective spark plug cap	Replace the spark plug cap.
	Defective ignition coil	Replace the ignition coil.
	ECU failure	Replace the ECU.
Low fuel pressure	—	Measure the fuel pressure.
	Fuel leakage	Check the fuel passage. Repair or replace as necessary.
	Clogged fuel pump	Clean or replace the fuel pump.
	Cracks or damage in fuel pump	Replace the fuel pump.
	Fuel pump malfunction	Refer to “TROUBLESHOOTING” under “FUEL PUMP SYSTEM” (ELECTRICAL SYSTEM) in the Service manual.
Fuel not supplied	Failed or clogged fuel injector	Replace the fuel injector.
	ECU failure	Replace the ECU.
Compression pressure is low	Refer to “Engine will not start or is difficult to start, but it cranks (fuel injection models)”.	

TROUBLESHOOTING

Symptom	Possible cause	Actions
—	Worn camshaft lobe	Replace the camshaft.
	Water or foreign material in fuel, degraded fuel	Change fuel.
	Contaminated throttle body or clogged internal passage	Clean the throttle body.
	Incorrectly adjusted throttle cable	Adjust the throttle grip free play.
	Improperly synchronized throttle bodies	Adjust synchronization of throttle bodies.
	Incorrectly adjusted idling speed (idle adjusting screw)	Adjust the idle adjusting screw.
	Contaminated idle speed control (ISC) valve	Clean the idle speed control (ISC) valve.
	Damaged idle speed control (ISC) valve	Replace the idle speed control (ISC) valve.
	Incorrect idle speed control (ISC) valve position	Reset the learning value of idle speed control (ISC) valve.
	Incorrect throttle position sensor angle	Adjust the throttle position sensor angle.
	Incorrect acceleration position sensor angle	Adjust the acceleration position sensor angle.
	Faulty ECU	Replace the ECU.
	Failed air induction system	Check the air induction system. Repair or replace faulty parts.
	Clogged vacuum hose	Clean the vacuum hose.
	Cracks and damage in vacuum hose	Replace the vacuum hose.
	Damaged throttle body joint	Replace the throttle body joint.
	Loose throttle body joint	Tighten the throttle body joint bolts to the specified torque.
	Clogged air filter element	Clean or replace the air filter element.
	Incorrect oil level (high)	Adjust the oil level to the specified level.

TROUBLESHOOTING

Incorrect idling speed (carburetor models)

Symptom	Possible cause	Actions
Spark plug does not produce a spark	Incorrect spark plug gap	Adjust the spark plug gap.
	Worn or damaged spark plug	Replace the spark plug.
	Defective spark plug cap	Replace the spark plug cap.
	Defective ignition coil	Replace the ignition coil.
	CDI unit failure	Replace the CDI unit.
Fuel not supplied	Fuel leakage	Check the fuel passage. Repair or replace as necessary.
	Clogged carburetor fuel passage	Clean the carburetor.
	Clogged needle valve or needle valve seat	Clean the needle valve or needle valve seat.
	Damaged float	Replace the float.
Compression pressure is low	Refer to "Engine will not start or is difficult to start, but it cranks (carburetor models)".	

TROUBLESHOOTING

Symptom	Possible cause	Actions
—	Worn camshaft lobe	Replace the camshaft.
	Water or foreign material in fuel, degraded fuel	Change fuel.
	Clogged carburetor air passage	Clean the carburetor.
	Incorrectly adjusted throttle cable	Adjust the throttle grip free play.
	Improperly synchronized carburetors	Adjust synchronization of carburetors.
	Incorrectly adjusted idling speed (throttle stop screw)	Adjust the throttle stop screw.
	Incorrectly adjusted pilot screw	Adjust the pilot screw.
	Incorrectly adjusted pilot air screw	Adjust the pilot air screw.
	Clogged pilot jet	Clean the pilot jet.
	Loose pilot jet	Tighten the pilot jet to the specified torque.
	Damaged or worn needle valve seat	Replace the needle valve seat.
	Loose needle valve seat	Tighten the needle valve seat to the specified torque.
	Damaged or worn needle valve	Replace the needle valve.
	Incorrect fuel level	Adjust the fuel level to the proper level.
	Bent, worn, or damaged starter plunger	Replace the starter plunger.
	Incorrectly adjusted starter cable	Adjust the starter cable.
	Clogged or damaged carburetor breather hose	Clean, repair, or replace the carburetor breather hose.
	Incorrect throttle position sensor angle	Adjust the throttle position sensor angle.
	Failed air induction system	Check the air induction system. Repair or replace faulty parts.
	Clogged vacuum hose	Clean the vacuum hose.
	Cracks and damage in vacuum hose	Replace the vacuum hose.
	Damaged carburetor joint	Replace the carburetor joint.
	Loose carburetor joint	Tighten the carburetor joint bolts to the specified torque.
	Clogged air filter element	Clean or replace the air filter element.
	Incorrect oil level (high)	Adjust the oil level to the specified level.

TROUBLESHOOTING

Incorrect mid-high speed (carburetor models)

Symptom	Possible cause	Actions
Spark plug does not produce a spark	Incorrect spark plug gap	Adjust the spark plug gap.
	Worn or damaged spark plug	Replace the spark plug.
	Defective spark plug cap	Replace the spark plug cap.
	Defective ignition coil	Replace the ignition coil.
	CDI unit failure	Replace the CDI unit.
Fuel not supplied	Fuel leakage	Check the fuel passage. Repair or replace as necessary.
	Clogged carburetor fuel passage	Clean the carburetor.
	Clogged needle valve or needle valve seat	Clean the needle valve or needle valve seat.
	Damaged float	Replace the float.
Compression pressure is low	Refer to "Engine will not start or is difficult to start, but it cranks (carburetor models)".	

TROUBLESHOOTING

Symptom	Possible cause	Actions
—	Worn camshaft lobe	Replace the camshaft.
	Water or foreign material in fuel, degraded fuel	Change fuel.
	Clogged carburetor air passage	Clean the carburetor.
	Incorrectly adjusted throttle cable	Adjust the throttle grip free play.
	Improperly synchronized carburetors	Adjust synchronization of carburetors.
	Incorrectly adjusted pilot screw	Adjust the pilot screw.
	Incorrectly adjusted pilot air screw	Adjust the pilot air screw.
	Clogged pilot jet	Clean the pilot jet.
	Loose pilot jet	Tighten the pilot jet to the specified torque.
	Clogged main nozzle	Clean the main nozzle.
	Loose main nozzle	Tighten the main nozzle to the specified torque.
	Clogged main jet	Clean the main jet.
	Loose main jet	Tighten the main jet to the specified torque.
	Bent, damaged, or worn jet needle	Replace the jet needle.
	Cracks or damage in the piston valve diaphragm	Replace the piston valve diaphragm.
	Problem with piston valve movement (movement is not smooth)	Replace the piston valve.
	Damaged or worn needle valve seat	Replace the needle valve seat.
	Loose needle valve seat	Tighten the needle valve seat to the specified torque.
	Damaged or worn needle valve	Replace the needle valve.
	Incorrect fuel level	Adjust the fuel level to the proper level.
	Bent, worn, or damaged starter plunger	Replace the starter plunger.
	Incorrectly adjusted starter cable	Adjust the starter cable.
	Clogged or damaged carburetor breather hose	Clean, repair, or replace the carburetor breather hose.
	Incorrect throttle position sensor angle	Adjust the throttle position sensor angle.
	Failed air induction system	Check the air induction system. Repair or replace faulty parts.
	Clogged vacuum hose	Clean the vacuum hose.
	Cracks and damage in vacuum hose	Replace the vacuum hose.
	Damaged carburetor joint	Replace the carburetor joint.
	Loose carburetor joint	Tighten the carburetor joint bolts to the specified torque.
	Clogged air filter element	Clean or replace the air filter element.
	Incorrect oil level (high)	Adjust the oil level to the specified level.

TROUBLESHOOTING

Excessive noise from engine

Symptom	Possible cause	Actions
Noise heard from around cylinder head	Incorrect valve clearance (too wide)	Adjust the valve clearance.
	Fatigued or broken valve spring	Replace the valve spring.
	Worn or damaged camshaft lobe	Replace the camshaft.
	Worn or damaged valve lifter	Replace the valve lifter and cylinder head as a set.
	Worn or damaged rocker arm	Replace the rocker arm.
	Worn or damaged rocker arm shaft	Replace the rocker arm shaft.
	Worn or damaged camshaft journal	Replace the camshaft.
	Worn or damaged cylinder head (camshaft journal)	Replace the cylinder head.
Noise heard from around timing chain	Worn or damaged timing chain	Replace the timing chain and camshaft sprocket as a set.
	Worn or damaged camshaft sprocket	Replace the timing chain and camshaft sprocket as a set.
	Worn or damaged timing chain guide	Replace the timing chain guide.
	Cracked, damaged, or faulty timing chain tensioner	Replace the timing chain tensioner.
Noise heard from around piston	Worn or damaged piston ring	Replace the piston and piston rings as a set.
	Worn or damaged piston	Replace the piston and piston rings as a set.
	Worn piston (piston pin hole)	Replace the piston and piston pin as a set.
	Worn or damaged piston pin	Replace the piston pin.
	Worn or damaged cylinder bore	Replace the cylinder, piston, and piston rings as a set.
	Carbon buildup in piston head and combustion chamber	Clean the piston head and combustion chamber.

TROUBLESHOOTING

Symptom	Possible cause	Actions
Noise heard from around crankshaft	Worn or damaged crankshaft journal or crank pin	Replace the crankshaft.
	Cracked, worn, or damaged balancer shaft	Replace the balancer drive gear and balancer shaft as a set.
	Worn or damaged balancer drive gear.	Replace the balancer drive gear and balancer shaft as a set.
	Worn or damaged big end bearing	Replace the big end bearing.
	Worn or damaged crankshaft journal bearing	Replace the crankshaft journal bearing.
	Worn or damaged balancer shaft journal bearing	Replace the balancer shaft journal bearing.

TROUBLESHOOTING OF CLUTCH

Manual clutch

Symptom	Possible cause	Actions
Clutch slippage	Improperly assembled clutch	Reassemble the clutch.
	Improperly adjusted clutch cable	Adjust the clutch lever free play.
	Improperly assembled clutch master cylinder (hydraulic clutch)	Reassemble the clutch master cylinder.
	Improperly assembled clutch fluid reservoir (hydraulic clutch)	Reassemble the clutch fluid reservoir.
	Improperly assembled clutch release cylinder (hydraulic clutch)	Reassemble the clutch release cylinder.
	Damaged clutch release cylinder (hydraulic clutch)	Replace the clutch release cylinder.
	Incorrect clutch fluid level (low) (hydraulic clutch)	Add clutch fluid to the specified level.
	Damaged clutch hose (hydraulic clutch)	Replace the clutch hose.
	Loose union bolt (hydraulic clutch)	Tighten the union bolt to the specified torque.
	Loose clutch spring	Tighten the clutch spring bolts to the specified torque.
	Fatigued or broken clutch spring	Replace the clutch springs as a set.
	Warped pressure plate	Replace the pressure plate.
	Worn friction plate	Replace the friction plates as a set.
	Warped or worn clutch plate	Replace the clutch plates as a set.
	Incorrect oil level	Adjust the engine oil level to the specified level.
	Incorrect oil viscosity (low)	Change to recommended engine oil.
	Deteriorated oil	Change to recommended engine oil.

TROUBLESHOOTING

Symptom	Possible cause	Actions
Clutch drags	Air in hydraulic clutch system (hydraulic clutch)	Bleed the hydraulic clutch system.
	Fluid leakage from hydraulic clutch system (hydraulic clutch)	Check the hydraulic clutch system and repair or replace faulty parts as necessary.
	Faulty clutch spring	Replace the clutch springs as a set.
	Warped pressure plate	Replace the pressure plate.
	Swollen friction plate	Replace the friction plates as a set.
	Warped clutch plate	Replace the clutch plates as a set.
	Bent pull rod (outer pull type)	Replace the pull rod.
	Worn pull rod tooth (outer pull type)	Replace the pull rod and pull lever shaft as a set.
	Bent push rod (inner push type)	Replace the push rod.
	Damaged or worn clutch boss	Replace the clutch boss.
	Seized clutch housing bushing	Replace the clutch housing.
	Improperly installed pull lever	Align the match mark on the pull lever before installation.
	Incorrect oil level	Adjust the engine oil level to the specified level.
	Incorrect oil viscosity (high)	Change to recommended engine oil.
	Deteriorated oil	Change to recommended engine oil.
Clutch noise	Damaged or worn primary driven gear	Replace the primary drive gear or crankshaft, and the clutch housing as a set.
	Loose clutch boss nut	Tighten the clutch boss nut to the specified torque.
	Fatigued clutch damper	Replace the clutch housing.
	Worn clutch housing bearing	Replace the clutch housing bearing.
	Worn pressure plate bearing	Replace the pressure plate bearing.

TROUBLESHOOTING

V-belt automatic transmission

Symptom	Possible cause	Actions
Possible to start engine but impossible to drive motorcycle	Damaged or worn V-belt	Replace the V-belt.
	Damaged primary sliding sheave (slider rib)	Replace the primary sliding sheave.
	Loose primary fixed sheave nut	Tighten the primary fixed sheave nut to the specified torque.
	Damaged secondary compression spring	Replace the secondary compression spring.
	Damaged transmission gear	Check the transmission gear. Replace defective parts.
Clutch slippage	Damaged clutch shoe spring	Replace the clutch shoe springs as a set.
	Damaged or worn clutch shoe	Replace the clutch shoes and springs as a set.
	Damaged or worn clutch housing	Replace the clutch housing.
Poor starting performance	Damaged or worn V-belt	Replace the V-belt.
	Oil or grease on the V-belt	Clean the V-belt, primary sheave, and secondary sheave.
	Faulty primary sliding sheave	Check the primary sliding sheave, cam, and slider. Repair or replace faulty parts as necessary.
	Damaged or worn clutch shoe	Replace the clutch shoes and springs as a set.
	Damaged or worn clutch housing	Replace the clutch housing.
Poor speed performance	Damaged or worn V-belt	Replace the V-belt.
	Oil or grease on the V-belt	Clean the V-belt, primary sheave, and secondary sheave.
	Faulty primary sliding sheave	Check the primary sliding sheave, cam, and slider. Repair or replace faulty parts as necessary.
	Damaged or worn primary sheave weight	Replace the primary sheave weight as a set.
	Worn primary fixed sheave (pulley side)	Replace the primary fixed sheave.
	Worn primary sliding sheave (pulley side)	Replace the primary sliding sheave.

TROUBLESHOOTING

Symptom	Possible cause	Actions
Noise from clutch and transmission	Damaged or worn transmission gear	Check the transmission gear. Replace defective parts.
	Worn main axle spline	Replace the main axle.
	Worn drive axle spline	Replace the drive axle.
	Damaged or worn transmission bearing	Replace the transmission bearing.

TROUBLESHOOTING OF TRANSMISSION

Symptom	Possible cause	Actions
Difficult or impossible to shift transmission gear	Clutch drags	Refer to "Clutch drags".
	Improperly adjusted shift rod	Adjust the shift rod installation length.
	Bent shift shaft	Replace the shift shaft.
	Foreign object in a shift drum groove	Remove foreign object from shift drum groove.
	Damaged shift drum	Replace the shift drum.
	Seized shift fork	Replace the shift fork and shift fork guide bar as a set.
	Bent shift fork guide bar	Replace the shift fork guide bar.
	Foreign object between transmission gears	Remove foreign object from transmission gears.
	Seized transmission gear	Replace the seized gear and the axle as a set.
	Improperly assembled transmission	Reassemble the transmission axle assembly.
Jumps out of gear	Incorrect shift pedal position	Adjust the shift pedal position.
	Improperly returned stopper lever	Replace the stopper lever spring.
	Bent or worn shift fork	Replace the shift fork.
	Shift drum incorrect axial play	Replace the shift drum.
	Worn shift drum groove	Replace the shift drum.
	Worn transmission gear dog	Replace the transmission gear.
Transmission noise	Damaged or worn transmission gear	Replace the transmission gear.
	Worn main axle spline	Replace the main axle.
	Worn drive axle spline	Replace the drive axle.
	Worn bearing	Replace the bearing.

TROUBLESHOOTING

TROUBLESHOOTING OF COOLING SYSTEM

Symptom	Possible cause	Actions
Overheating	Carbon buildup in piston head and combustion chamber	Clean the piston head and combustion chamber.
	Clogged engine cooling water passages	Check and clean the engine cooling water passages.
	Incorrect oil level	Adjust the oil level to the specified level.
	Incorrect oil viscosity	Change to recommended engine oil.
	Inferior oil quality	Change to recommended engine oil.
	Low coolant level	Add recommended coolant to the specified level.
	Damaged or leaking radiator	Replace the radiator.
	Faulty radiator cap	Replace the radiator cap.
	Clogged radiator fin	Clean the radiator fin.
	Bent or damaged radiator fin	Repair the radiator fin or replace the radiator.
	Faulty radiator fan motor	Refer to "TROUBLESHOOTING" under "COOLING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.
	Damaged or faulty water pump	Replace the water pump.
	Thermostat stays closed	Replace the thermostat.
	Clogged or damaged oil cooler	Replace the oil cooler.
	Damaged hoses or pipes	Replace the hose or pipe.
	Improperly connected hoses or pipes	Connect the hoses and pipes properly.
	Damaged throttle body joint	Replace the throttle body joint.
	Loose throttle body joint	Tighten the throttle body joint bolts to the specified torque.
	Clogged air filter element	Clean or replace the air filter element.
	Brake drags	Check the brake system and repair or replace faulty parts as necessary.
	Incorrect spark plug gap	Adjust to the specified spark plug gap.
	Incorrect spark plug heat range	Replace the spark plug with the one of the specified type.
	Faulty ECU	Replace the ECU.
Over cooling	Thermostat stays open	Replace the thermostat.

TROUBLESHOOTING

Symptom	Possible cause	Actions
Noise from water pump	Contact between the water pump housing cover and impeller	Disassemble the water pump and replace faulty parts.
	Worn water pump housing bearing	Replace the water pump housing bearing.

TROUBLESHOOTING OF BRAKE

Symptom	Possible cause	Actions
Poor performance of disc brake	Worn brake pad	Replace the brake pads as a set.
	Worn or deflected brake disc	Replace the brake disc.
	Air in hydraulic brake system	Bleed the hydraulic brake system.
	Brake fluid leakage	Check the hydraulic brake system and repair or replace faulty parts as necessary.
	Incorrect brake fluid level (low)	Add brake fluid to the specified level.
	Stuck brake caliper piston	Replace the caliper piston seal.
	Stuck brake caliper and slide pin	Lubricate the caliper slide pin.
	Loose union bolt	Tighten the union bolt to the specified torque.
	Damaged brake hose and brake pipe	Replace the brake hose and brake pipe.
	Oil or grease on the brake disc or brake pad	Clean the brake disc or brake pad.
	Insufficient lubrication of brake lever or brake pedal pivot	Lubricate the brake lever or brake pedal pivot.

TROUBLESHOOTING

Symptom	Possible cause	Actions
Poor performance of drum brake	Worn brake shoe	Replace the brake shoes and brake shoe tension springs as a set.
	Corroded or worn brake drum	Replace the brake drum.
	Incorrect brake pedal position	Adjust the brake pedal to the specified position.
	Incorrect brake pedal free play	Adjust the brake pedal free play to specification.
	Incorrect brake camshaft lever position	Install the brake camshaft lever to the correct position.
	Incorrect brake shoe position	Install the brake shoe to the correct position.
	Fatigued or damaged brake shoe tension spring	Replace the brake shoe tension springs as a set.
	Damaged brake torque rod	Replace the brake torque rod.
	Oil or grease on the brake drum or brake shoe	Clean the brake drum or brake shoes.
	Insufficient lubrication of brake camshaft	Lubricate the brake camshaft.
	Insufficient lubrication of brake pedal pivot	Lubricate the brake pedal pivot.

TROUBLESHOOTING AT ABS WARNING LIGHT

Refer to "TROUBLESHOOTING" under "ABS" (ELECTRICAL SYSTEM) in the Service manual.

TROUBLESHOOTING

TROUBLESHOOTING OF SUSPENSION

Symptom	Possible cause	Actions
Front fork is hard	Bent or damaged inner tube	Replace the inner tube.
	Bent or damaged outer tube	Replace the outer tube.
	Damaged or worn outer tube bushing	Replace the outer tube bushing.
	Bent or damaged damper rod	Replace the damper rod.
	Bent wheel axle	Replace the wheel axle.
	Incorrect oil viscosity (high)	Change to recommended fork oil.
	Incorrect oil level (high)	Adjust to the specified oil level.
	Improperly adjusted spring preload (hard)	Adjust the spring preload.
	Improperly adjusted rebound damping (hard)	Adjust the rebound damping.
	Improperly adjusted compression damping (hard)	Adjust the compression damping.
Front fork is soft	Fatigued or broken fork spring	Replace the fork spring.
	Incorrect oil viscosity (low)	Change to recommended fork oil.
	Incorrect oil level (low)	Adjust to the specified oil level.
	Improperly adjusted spring preload (soft)	Adjust the spring preload.
	Improperly adjusted rebound damping (soft)	Adjust the rebound damping.
	Improperly adjusted compression damping (soft)	Adjust the compression damping.
Leaking oil from front fork	Bent, damaged, or corroded inner tube	Replace the inner tube.
	Cracked or damaged outer tube	Replace the outer tube.
	Improperly installed oil seal	Replace the oil seal.
	Damaged oil seal lip	Replace the oil seal.
	Incorrect oil level (high)	Adjust to the specified oil level.
	Loose damper rod assembly bolt	Tighten the damper rod assembly bolt to the specified torque.
	Damaged damper rod assembly bolt copper washer	Replace the damper rod assembly bolt copper washer.
	Cracked or damaged cap bolt O-ring	Replace the cap bolt O-ring.

TROUBLESHOOTING

Symptom	Possible cause	Actions
Rear suspension is hard	Bent or damaged rear shock absorber rod	Replace the rear shock absorber.
	Bent swingarm pivot shaft	Replace the swingarm pivot shaft.
	Damaged or worn swingarm bearing or bushing	Replace the swingarm bearing or bushing.
	Damaged or worn relay arm bearing	Replace the relay arm bearing.
	Damaged or worn connecting arm bearing	Replace the connecting arm bearing.
	Improperly adjusted rear shock absorber spring preload (hard)	Adjust the spring preload.
	Improperly adjusted rear shock absorber rebound damping (hard)	Adjust the rebound damping.
	Improperly adjusted rear shock absorber compression damping (hard)	Adjust the compression damping.
Rear suspension is soft	Oil leaking from rear shock absorber	Replace the rear shock absorber.
	Gas leaking from rear shock absorber	Replace the rear shock absorber.
	Fatigued or damaged rear shock absorber spring	Replace the rear shock absorber.
	Improperly adjusted rear shock absorber spring preload (soft)	Adjust the spring preload.
	Improperly adjusted rear shock absorber rebound damping (soft)	Adjust the rebound damping.
	Improperly adjusted rear shock absorber compression damping (soft)	Adjust the compression damping.
Oil leaking from rear shock absorber	Bent, damaged, or corroded rear shock absorber rod	Replace the rear shock absorber.
	Damaged oil seal lip	Replace the rear shock absorber.

TROUBLESHOOTING

TROUBLESHOOTING OF STEERING/HANDLING

Symptom	Possible cause	Actions
Handlebar wobble	Loose lower ring nut	Tighten the lower ring nut to the specified torque.
	Worn bearing or bearing race	Replace the bearing and bearing race as a set.
	Warped front fork	Repair or replace the front fork.
	Bent front wheel axle	Replace the front wheel axle.
	Incorrect tire pressure	Adjust to the specified tire pressure.
	Worn, deformed, or incorrect tire	Replace the tire.
Heavy steering	Lower ring nut is tightened too tight.	Tighten the lower ring nut to the specified torque.
	Bent lower bracket	Replace the lower bracket.
	Broken bearing or bearing race	Replace the bearing and bearing race as a set.
	Incorrect tire pressure	Adjust to the specified tire pressure.
Front wheel vibration	Incorrect wheel balance	Adjust the wheel balance.
	Deformed wheel (cast wheel, pressed wheel)	Replace the wheel.
	Loose spoke (spoke wheel)	Tighten the spoke and adjust the runout.
	Damaged or worn wheel bearing	Replace the wheel bearing.
	Worn, deformed, or incorrect tire	Replace the tire.
	Loose wheel axle or wheel axle nut	Tighten the wheel axle or wheel axle nut to the specified torque.
	Loose wheel axle pinch bolt	Tighten the wheel axle pinch bolt to the specified torque.
	Incorrect front fork oil level	Adjust to the specified front fork oil level.
Rear wheel vibration	Incorrect wheel balance	Adjust the wheel balance.
	Deformed wheel (cast wheel, pressed wheel)	Replace the wheel.
	Loose spoke (spoke wheel)	Tighten the spoke and adjust the runout.
	Damaged or worn wheel bearing	Replace the wheel bearing.
	Worn, deformed, or incorrect tire	Replace the tire.
	Loose wheel axle nut	Tighten the wheel axle nut to the specified torque.
	Loose swingarm pivot shaft	Tighten the swingarm pivot shaft to the specified torque.
	Bent or damaged swingarm	Replace the swingarm bearing.
	Damaged or worn swingarm bearing or bushing	Replace the swingarm bearing or bushing.

TROUBLESHOOTING

TROUBLESHOOTING OF CHARGING SYSTEM

Symptom	Possible cause	Actions
Battery is not charged	Refer to "TROUBLESHOOTING" under "CHARGING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	

TROUBLESHOOTING OF LIGHTING SYSTEM

Symptom	Possible cause	Actions
Headlight does not come on	Refer to "TROUBLESHOOTING" under "LIGHTING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	
Taillight does not come on	Refer to "TROUBLESHOOTING" under "LIGHTING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	
License plate light does not come on	Refer to "TROUBLESHOOTING" under "LIGHTING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	
Meter light does not come on	Refer to "TROUBLESHOOTING" under "LIGHTING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	

TROUBLESHOOTING OF SIGNALING SYSTEM

Symptom	Possible cause	Actions
Brake light does not come on or go off	Refer to "TROUBLESHOOTING" under "SIGNALING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	
	Failed front brake light switch or rear brake light switch	Adjust or replace the front brake light switch or rear brake light switch.
Turn signal light or turn signal indicator light or both fail to blink, blink too early or too late, or fail to go off	Refer to "TROUBLESHOOTING" under "SIGNALING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	
Indicator lights do not come on properly	Refer to "TROUBLESHOOTING" under "SIGNALING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	
Horn does not sound	Refer to "TROUBLESHOOTING" under "SIGNALING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	
Speedometer fails to operate correctly	Refer to "TROUBLESHOOTING" under "SIGNALING SYSTEM" (ELECTRICAL SYSTEM) in the Service manual.	





YAMAHA

2024

SERVICE MANUAL

Ténéré 700

XTZ7R

IMPORTANT

This manual was produced by Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Please refer to "BASIC INFORMATION" (separate volume, Y0A-28197-10*) for basic instructions that must be observed during servicing. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the vehicle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from their vehicle and to conform to federal environmental quality objectives.



Yamaha Motor Company, Ltd. is continually striving to improve all of its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

TIP

- * If the contents of the manual are revised, the last digit of the manual number will be increased by one.
- This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.
- Designs and specifications are subject to change without notice.

IMPORTANT MANUAL INFORMATION

Particularly important information is distinguished in this manual by the following notations.

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
 WARNING	A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
NOTICE	A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.
TIP	A TIP provides key information to make procedures easier or clearer.

XTZ7R
SERVICE MANUAL
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 P/N LIT-11616-37-37

- The manual is divided into chapters and each chapter is divided into sections. The current section title “1” is shown at the top of each page.
- Sub-section titles “2” appear in smaller print than the section title.
- To help identify parts and clarify procedure steps, there are exploded diagrams “3” at the start of each removal and disassembly section.
- Numbers “4” are given in the order of the jobs in the exploded diagram. A number indicates a disassembly step.
- Symbols “5” indicate parts to be lubricated or replaced.
Refer to “SYMBOLS”.
- A job instruction chart “6” accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc. This step explains removal and disassembly procedure only. For installation and assembly procedure, reverse the steps.
- Jobs “7” requiring more information (such as special tools and technical data) are described sequentially.



SYMBOLS

The following symbols are used in this manual for easier understanding.

TIP

The following symbols are not relevant to every vehicle.



















SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Serviceable with engine mounted		Gear oil
	Filling fluid		Molybdenum disulfide oil
	Lubricant		Brake fluid
	Special tool		Wheel bearing grease
	Tightening torque		Lithium-soap-based grease
	Wear limit, clearance		Molybdenum disulfide grease
	Engine speed		Silicone grease
	Electrical data		Apply locking agent (LOCTITE®).
	Engine oil		Replace the part with a new one.

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GENERAL INFORMATION

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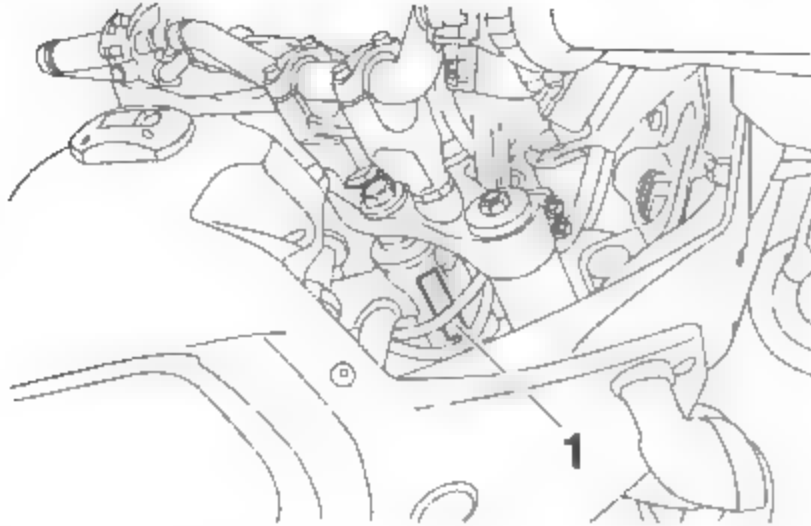
EAS20007

IDENTIFICATION

EAS30002

VEHICLE IDENTIFICATION NUMBER

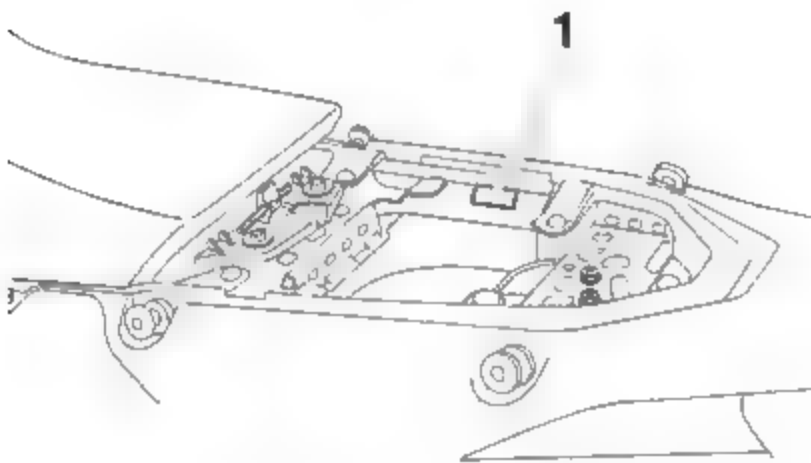
The vehicle identification number "1" is stamped into the right side of the steering head pipe.



EAS30003

MODEL LABEL

The model label "1" is affixed to the frame under the seat. This information will be needed to order spare parts.



EAS20008

FEATURES

EAS31707

DISPLAY

The main screen of the display has two different themes; "Explorer" and "Street". Some functions are not available in all themes.

EWA18210

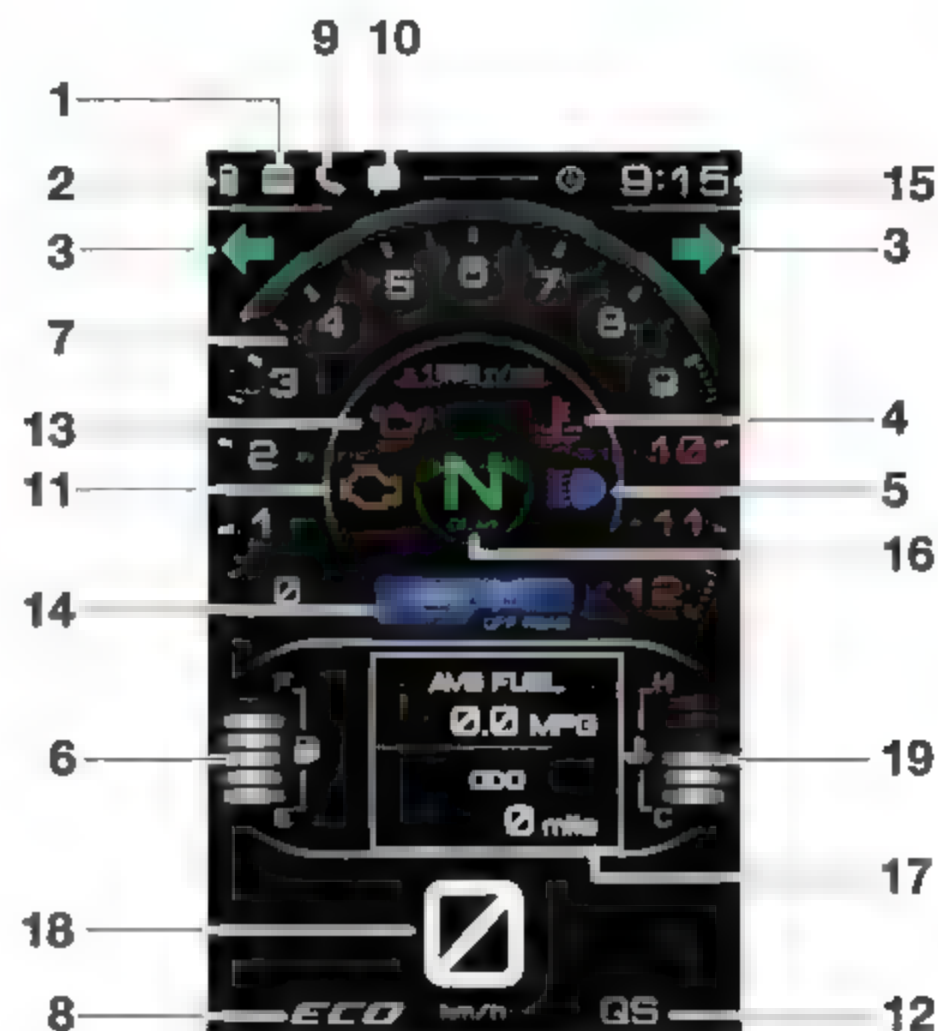
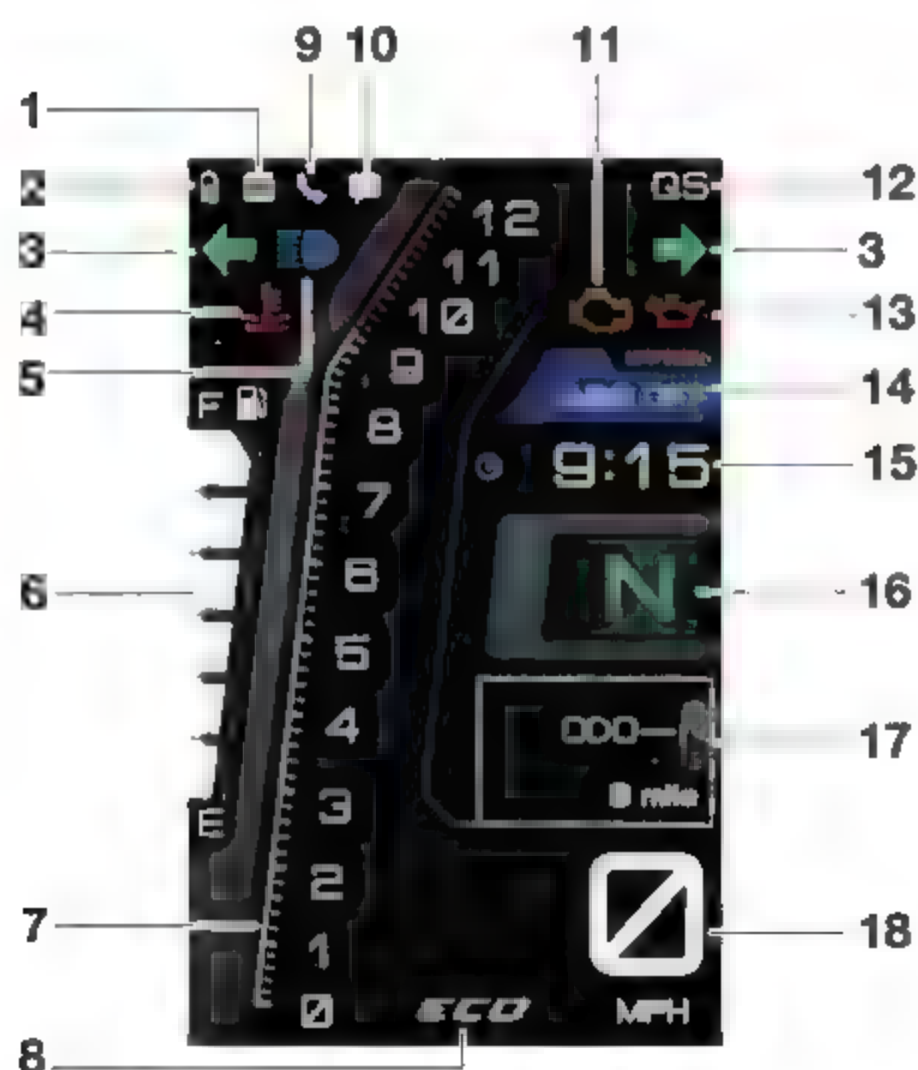
! WARNING

Stop the vehicle before making any setting changes. Changing settings while riding can distract the operator and increase the risk of an accident.

TIP

- This model uses a thin-film-transistor liquid-crystal display (TFT LCD) for good contrast and readability in various lighting conditions. However, due to the nature of this technology, it is normal for a small number of pixels to be inactive.
- The display units can be switched between kilometers/miles and celsius/fahrenheit.

"Explorer" theme/"Street" theme



1. Smartphone connectivity indicator "App"
2. Smartphone battery level indicator "B"
3. Turn signal indicators "←"/"→"
4. Coolant temperature warning indicator "⬆"
5. High beam indicator "⬆"
6. Fuel meter
7. Tachometer
8. Eco indicator
9. Missed call indicator "☎"
10. Unread message indicator "✉"
11. Malfunction indicator (MIL) "⚠"
12. Quick shift indicator "QS" (if equipped)
13. Oil pressure warning indicator "⚠"
14. ABS mode indicator
15. Clock
16. Transmission gear display
17. Information display
18. Speedometer
19. Coolant temperature meter

Speedometer

The speedometer shows the vehicle's traveling speed.

Tachometer

The tachometer shows the engine speed, as measured by the rotational velocity of the crankshaft, in revolutions per minute (r/min).

ECA19680

NOTICE

Do not operate the engine in the tachometer red zone.



Red zone:
9400 r/min and above

Fuel meter

The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the meter disappear from "F" (full) towards "E" (empty) as the fuel level decreases.

When the last segment starts flashing, refuel as soon as possible.

TIP

If all the fuel meter display segments flash repeatedly, check the fuel meter. Refer to "CHECKING THE FUEL METER" on page 8-45.

ECAE0121

NOTICE

Do not let the vehicle run completely out of fuel. This may cause damage to the catalytic converter.

Coolant temperature meter

The coolant temperature meter indicates the radiator coolant temperature.

When the coolant is too hot, the top segment will flash.

TIP

- The coolant temperature meter is only available in the "Street" theme.
- If all the coolant temperature meter display segments flash repeatedly, check the cooling system.

Clock "🕒"

The clock uses a 12-hour time system.

Transmission gear display

This shows which gear the transmission is in. This model has 6 gears and a neutral position. The neutral position is indicated by "N".

TIP

If a malfunction occurs, "-" will be shown.

Coolant temperature warning indicator "🔥"

This indicator is shown when the coolant temperature is too high. Stop the vehicle and turn off the engine. Allow the engine to cool.

ECA10022

NOTICE

Do not continue to operate the engine if it is overheating.

Oil pressure warning indicator "🛢️"

This indicator is shown when the engine oil pressure is low. When the vehicle power is first turned on, engine oil pressure has yet to build up, therefore this indicator will show until the engine has been started.

TIP

If a malfunction is detected, the oil pressure warning icon will flash repeatedly.

ECA00110

NOTICE

Do not continue to operate the engine if the oil pressure is low.

Malfunction indicator (MIL) "🚗"

The MIL comes on or flashes if a problem is detected in the engine or other vehicle control system. If this occurs, check the fuel injection system. Refer to "BASIC PROCESS FOR TROUBLESHOOTING" on page 9-11.

TIP

When the vehicle is turned on, this light should come on for a few seconds and then go off. Otherwise, check the fuel injection system. Refer to "BASIC PROCESS FOR TROUBLESHOOTING" on page 9-11.

High beam indicator "🚦"

This indicator is shown when the high beam of the headlight is on.

Turn signal indicators "👉"/"👈"

Each indicator flashes when its corresponding turn signal lights are flashing.

ABS mode indicator

This indicator shows the currently selected ABS mode. There are 3 ABS modes which can be changed within the menu system.

ABS status	Indicated on display
ABS is on	The indicator is off
Rear wheel ABS is off	"REAR ABS OFF" and "OFF ROAD"
ABS is off	"ABS OFF" and "OFF ROAD"

Eco indicator

This indicator is shown when the vehicle is being operated in an environmentally friendly, fuel-efficient manner. The indicator is not shown when idling.

TIP


Consider the following tips to reduce fuel consumption:

- Avoid high engine speeds during acceleration.

- Travel at a constant speed.
- Select the transmission gear that is appropriate for the vehicle speed.

Smartphone battery level indicator “ ”

This indicator displays the connected smartphone's current battery level.

- Icon off: No smartphone connected.
- “ ”: The center bar moves up and down to indicate the battery level.

When the battery level is below 11%, the indicator will turn red and flash continuously.

TIP

This indicator will flash 3 times when the vehicle power is turned on. If it does not flash when the vehicle power is turned on, check the CCU and the electrical circuit.

Smartphone connectivity indicator “ ”

This indicator comes on when a smartphone is successfully connected to the CCU.

TIP

This indicator will flash 3 times when the vehicle power is turned on. If it does not flash when the vehicle power is turned on, check the CCU and the electrical circuit.

Incoming call indicator



1. Incoming call indicator






1. Incoming call indicator

The incoming call indicator pops up when the connected smartphone receives a call. It will remain on for 30 seconds.

TIP

- In “Explorer” theme, this indicator cannot be displayed at the same time as any of the following:

- right turn signal indicator “ ”
- oil pressure warning indicator “ ”
- malfunction indicator (MIL) “ ”

If the above indicators go off, the incoming call indicator will be displayed for the remaining time.

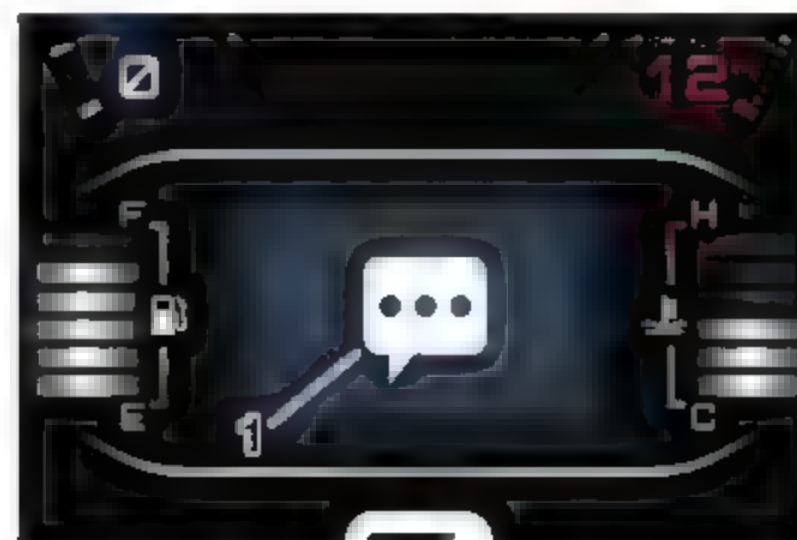
Missed call indicator “ ”

The missed call indicator comes on when the connected smartphone misses a call. It will remain on until the vehicle power is turned off or until “Cancel Notification” is selected in the “Telephone” section of the menu system.

Incoming message indicator



1. Incoming message indicator






1. Incoming message indicator

The incoming message indicator pops up when the connected smartphone receives an SMS, E-mail or other notification. It will remain on for 10 seconds.

TIP

- In “Explorer” theme, this indicator cannot be displayed at the same time as any of the following:

- right turn signal indicator “ ”
- oil pressure warning indicator “ ”
- malfunction indicator (MIL) “ ”

If the above indicators go off, the incoming message indicator will be displayed for the remaining time.

- Notifications must be setup for each application on the connected smartphone in advance.

Unread message indicator “”

The unread message indicator comes on when the connected smartphone receives a message. It will remain on until the vehicle power is turned off or until “Cancel Notification” is selected in the “Message” section of the menu system.

Quick shifter icon (if equipped)

This icon comes on when the quick shifter is active and able to shift. When the icon is not visible, the quick shifter will not operate.

Information display

The information display is a section of the main screen which contains various functions and information to aid the operator of the vehicle.

The information display items are:

“ODO”: odometer

“COOLANT”: coolant temperature

“AIR”: air temperature

“TRIP 1”: tripmeter 1

“TRIP 2”: tripmeter 2

“TRIP CD”: countdown tripmeter

“TRIP F”: fuel reserve tripmeter

“INST FUEL”: current fuel consumption


“AVG FUEL”: average fuel consumption


Rotate the “” wheel switch to cycle the items.

TIP

- The “TRIP 1”, “TRIP 2”, “TRIP CD”, “TRIP F”, and “AVG FUEL” items can be individually reset. The “TRIP CD” item can also be adjusted.
- In “Street” theme, 2 items are displayed at once.
- In “Explorer” theme, the information display is replaced by the speedometer when the pop-up menu is open.

To reset information display items:

If a displayed item can be reset, short pressing the “” wheel switch will highlight the item.

Once highlighted, long press “” wheel switch and the item will reset.

Odometer “ODO”:

The odometer shows the total distance traveled by the vehicle.

TIP

The odometer will lock at 999999 km (621370 mile) and cannot be reset.

Coolant temperature “COOLANT”:

The coolant temperature is displayed from 39 °C (103 °F) to 117 °C (243 °F) in 1 °C (1 °F) increments.

TIP

- If the vehicle coolant temperature is below 39 °C (103 °F) the coolant temperature display will read “Low Temp”
- If the vehicle coolant temperature is above 117 °C (243 °F) the coolant temperature display will read “High Temp”

Air temperature “AIR”:

The air temperature is displayed from –9 °C (16 °F) to 50 °C (122 °F) in 1 °C (1 °F) increments. The temperature displayed may vary from the actual ambient temperature.

TIP

“---” will be displayed if the detected temperature is higher or lower than the display range.



Tripmeters “TRIP 1” / “TRIP 2”:

“TRIP 1” and “TRIP 2” show the distance traveled since they were last set to zero.

TIP

“TRIP 1” and “TRIP 2” will reset to 0 and begin counting again after 9999.9 has been reached.

Countdown tripmeter “TRIP CD”:

Counts down from a set distance. Reset the countdown tripmeter and the first digit will flash. Rotate the “” wheel switch to adjust the flashing digit, short press the “” wheel switch to confirm and the next digit will flash. Repeat this until the third digit is confirmed and the tripmeter is set.

When the set mileage has been traveled, “0.0” will flash 10 times and then remain. If another information display item is being displayed, the countdown tripmeter will supersede it, flash 10 times, and then return to the previously displayed item.

TIP

The maximum set value is 900.0 km (600.0 miles)

Fuel reserve tripmeter "TRIP F":

When the fuel tank reserve level has been reached, "TRIP F" appears automatically and begins recording distance traveled from that point.

After refueling and traveling some distance, "TRIP F" will disappear.

Current fuel consumption "INST FUEL":

The current fuel consumption display can be set to "km/L", "L/100km" or "MPG" in the menu system.

TIP

If traveling at speeds under 10 km/h, "--.-" will be displayed.

Average fuel consumption "AVG FUEL":

The average fuel consumption display can be set to "km/L", "L/100km" or "MPG" in the menu system.

TIP

After resetting the average fuel consumption display, "--.-" will be shown until the vehicle has traveled 1 km.

EAS33968

MENU SYSTEM

TIP

- The menu system cannot be accessed while the vehicle is in motion or if certain warning lights/indicator icons are on. If this occurs while the menu system is already open, then the display will return to the main screen.
- If the "MENU" wheel switch is not operated for 10 seconds the menu system will close and the display will return to the main screen.

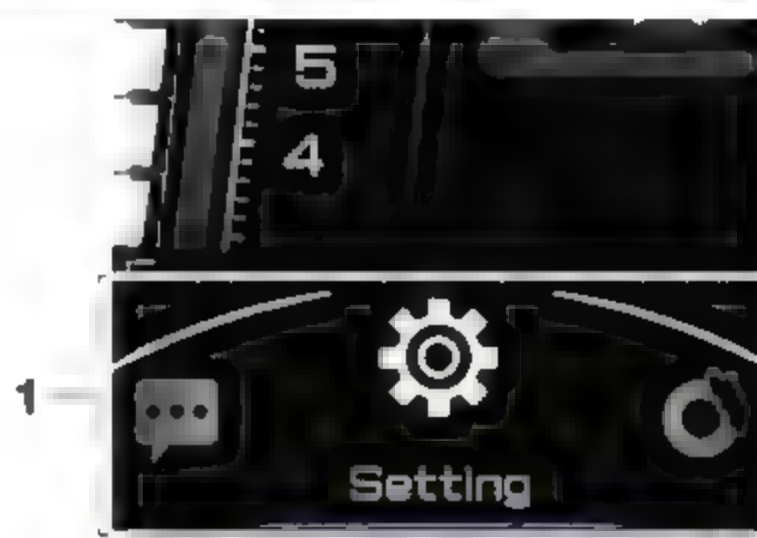
Menu system general operation:

The menu system for this vehicle is controlled with the "MENU" wheel switch on the right handlebar:

- While the main screen is displayed, long press the "MENU" wheel switch to open the menu system.
- Rotate the "MENU" wheel switch to cycle/select different items or adjust flashing item values.
- Short press the "MENU" wheel switch to highlight/de-highlight a selected item.
- While an item is highlighted, long press the "MENU" wheel switch to set an item or confirm a setting.

TIP

If no menu item is highlighted, long press of the "MENU" wheel switch will close the pop-up menu.



1. Pop-up menu

The pop-up menu is divided into the following main modules:

"Setting"	Adjust settings related to the multi-function meter's operation.
"ABS Mode"	Turn ABS on/off.
"Themes"	Change between display themes.
"Telephone"	Telephone notification settings.
"Message"	Message notification settings.



"ABS Mode"



This menu allows you to turn the anti-lock braking system on/off or rear wheel only off. The currently selected ABS mode is indicated by the ABS mode indicator on the main screen. Select a menu item and short press the "MENU" wheel switch to highlight it. Long press the "MENU" wheel switch to change the ABS to that setting.

TIP

- When one of the ABS items is set, the display will return to the main screen instead of the previous menu screen.

- The ABS will remain disabled until:
 - The main switch is turned off.
 - The Stop/run/start switch “/○/⊗” is turned to off “” while the engine is running.
 - The “ABS ON” button is pressed while the vehicle is not moving.
 - The ABS is reactivated via the menu system while the vehicle is not moving.

EWA21100

WARNING

Always ride on paved roads with the ABS turned on. Turn the ABS off only when riding on non-paved surfaces.

“Themes”



This module allows you to switch between display themes. Select a theme and the display will return to the main screen in that theme.

“Telephone”



This module allows you to clear all stored call notifications. When “Cancel Notification” is selected, the incoming/missed call icon will disappear from the main screen.

“Message”



This module allows you to clear all stored message notifications. When “Cancel Notification” is selected, the message icon will disappear from the main screen.

Setting menu

The Setting menu is divided into the following modules:

“Maintenance”	Set maintenance tripmeters.
“Unit”	Change measurement units.
“Brightness”	Adjust display brightness.
“Clock”	Set clock.
“All Reset”	Reset system settings.

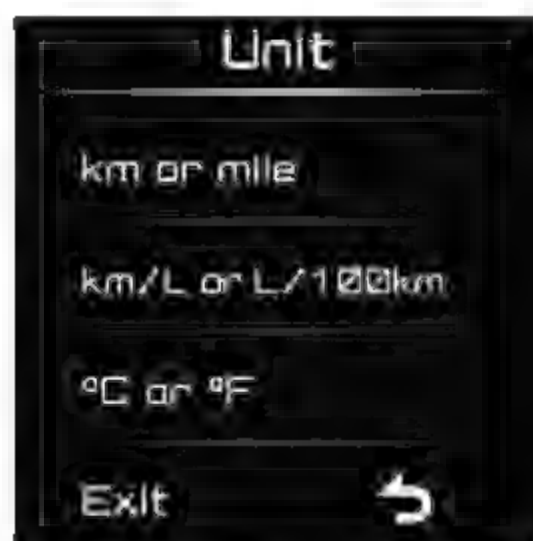
“Maintenance”



This module allows you to record distance traveled between engine oil changes “Oil”, and two other maintenance intervals of your choice “Interval 1”/ “Interval 2”.

After maintenance to one of the items has been completed, short press the “MENU” wheel switch to select it and then long press the “MENU” wheel switch to reset it.

“Unit”



This module allows you to change the measurement units. Each of the three items contain a sub-menu where the desired unit is selected.

TIP

If “mile” is selected as a speed unit, “MPG” will be automatically set as the fuel economy unit and the menu item will be grayed out.



This module allows you to set the 12-hour clock. The hours and minutes are set individually.

“All Reset”

This module allows you to reset all of the following at once: tripmeters (not including maintenance tripmeters), and all measurement units.

“Brightness”



This module allows you to adjust the screen brightness between 3 different levels.

“Clock”





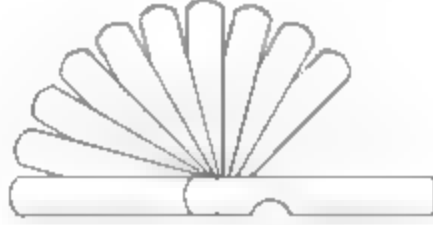
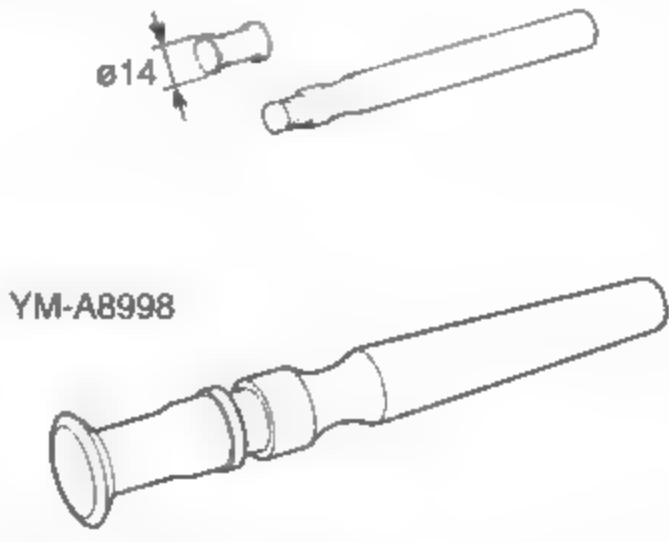

EAS20012

SPECIAL TOOLS


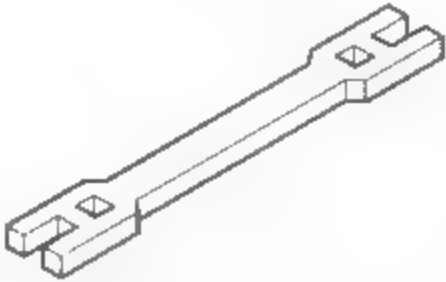
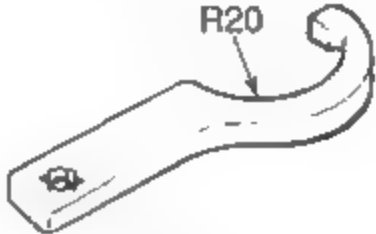


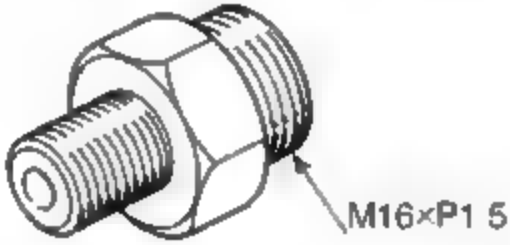
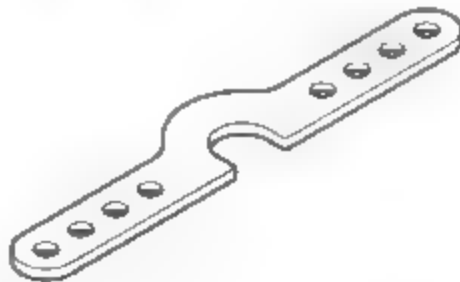
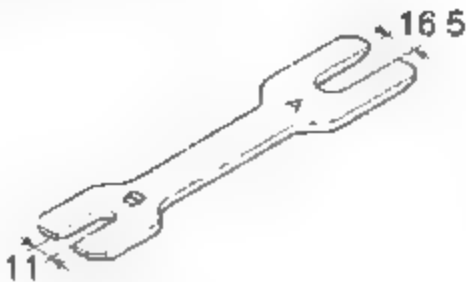
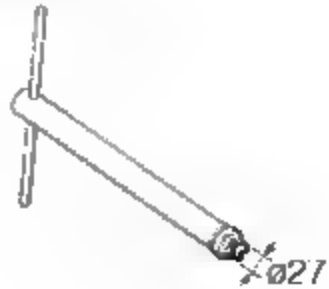
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country. When placing an order, refer to the list provided below to avoid any mistakes.

TIP

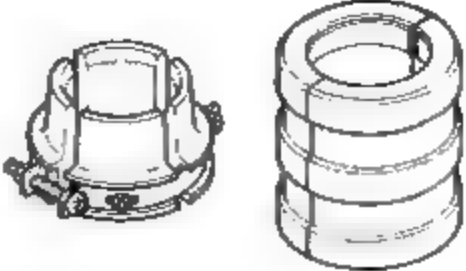

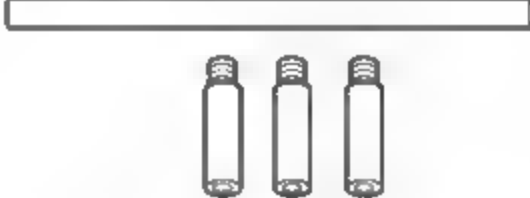
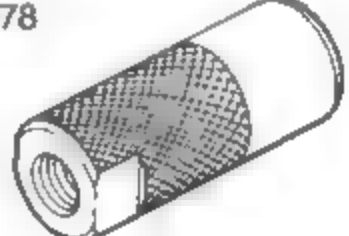

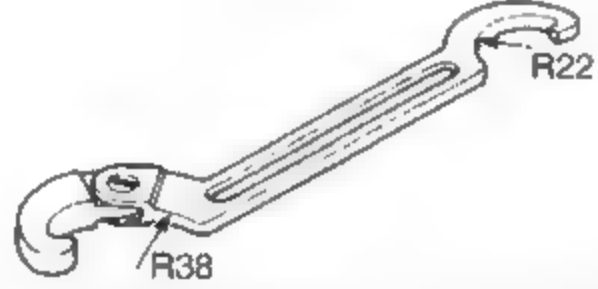

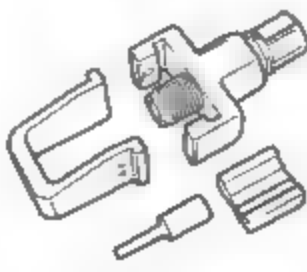
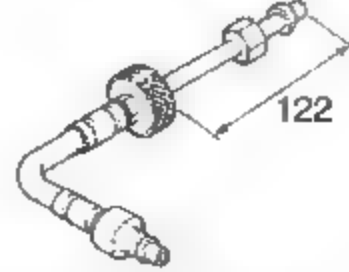
- For U.S.A. and Canada, use part number starting with "YM-", "YU-", or "ACC-".
- For others, use part number starting with "90890-".

Tool name/Tool No.	Illustration	Reference pages
Yamaha diagnostic tool USB (US) 90890-03269		3-4, 3-9, 4-54, 4-55, 9-2, 9-20, 9-21
Yamaha diagnostic tool (A/I) 90890-03273		3-4, 3-9, 4-54, 4-55, 9-2, 9-20, 9-21
Thickness gauge 90890-03268 Feeler gauge set YU-26900-9		3-7, 4-17, 4-25, 5-57
Valve lapper (ø14) 90890-04101 Valve lapper (ø14) YM-A8998		3-8
Vacuum gauge 90890-03094 Vacuummate YU-44456		3-10

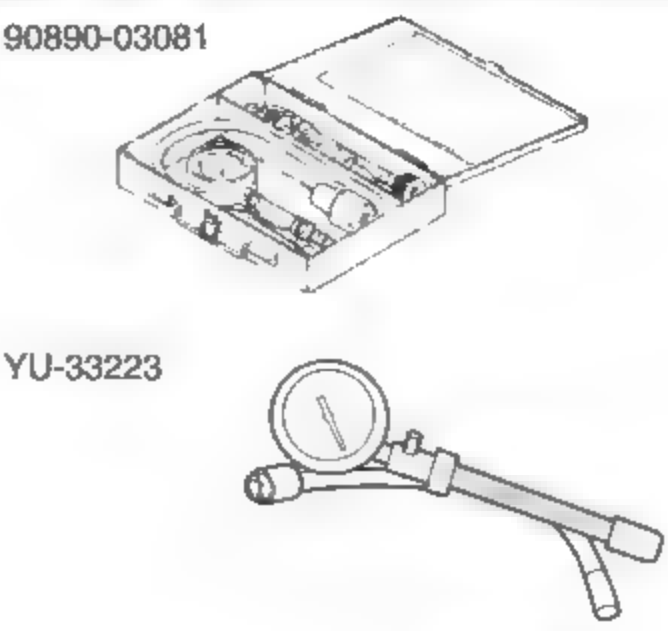
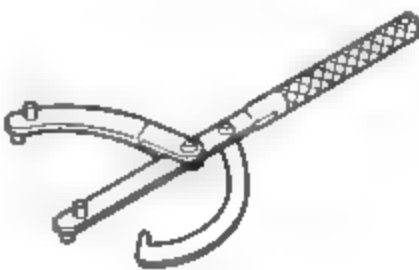

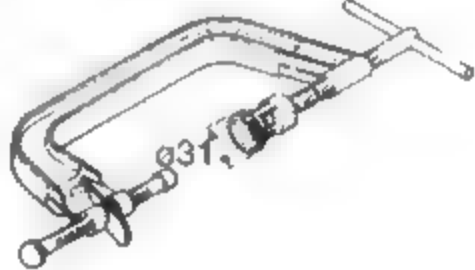
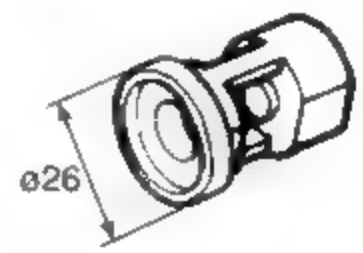
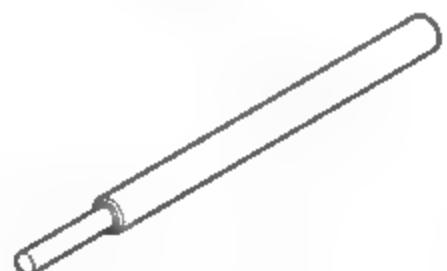
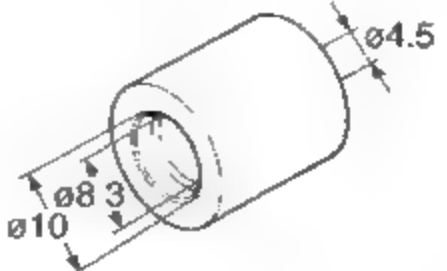
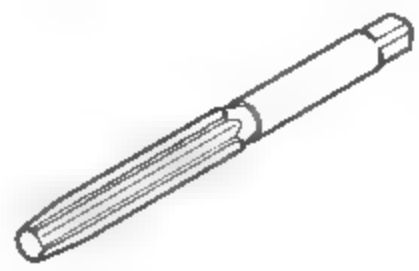
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Carburetor angle driver 2 90890-03173		3-10
Spoke nipple wrench (6-7) 90890-01521 Spoke nipple wrench (6-7) YM-01521		3-17
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-20, 4-76
Oil filter wrench 90890-01426 Oil filter wrench YU-38411		3-26
Pressure gauge 90890-03153 Pressure gauge YU-03153		3-27, 7-13, 7-14
Oil pressure adapter H 90890-03139		3-27
Fork spring compression tool 90890-01573 Fork spring compression tool YM-01573		4-67, 4-72
Rod holder 90890-01434 Damper rod holder double ended YM-01434		4-67, 4-72
Damper rod holder (ø27) 90890-01423 Damping rod holder YM-01423		4-68, 4-69

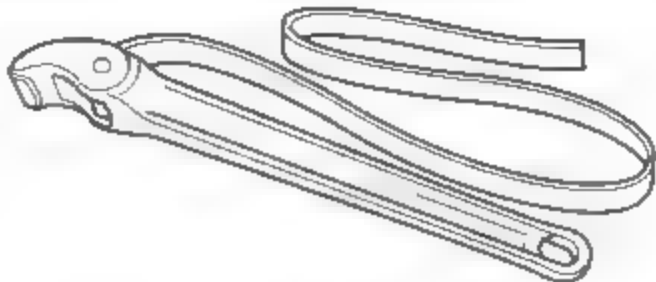
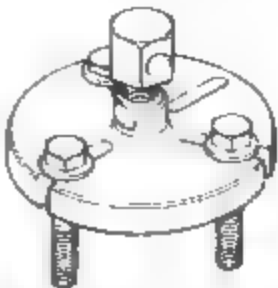
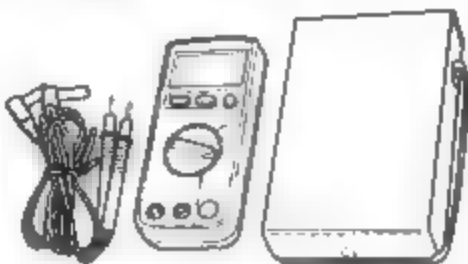
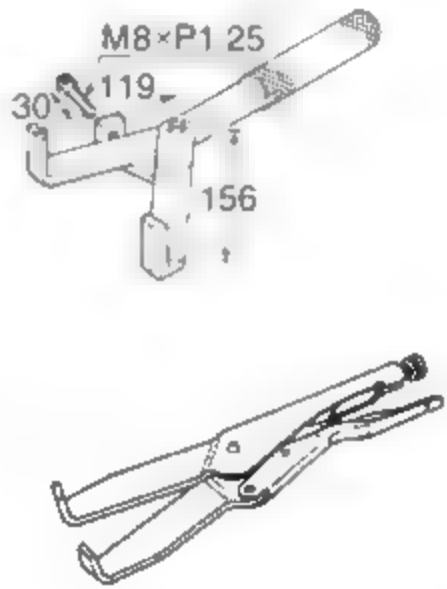
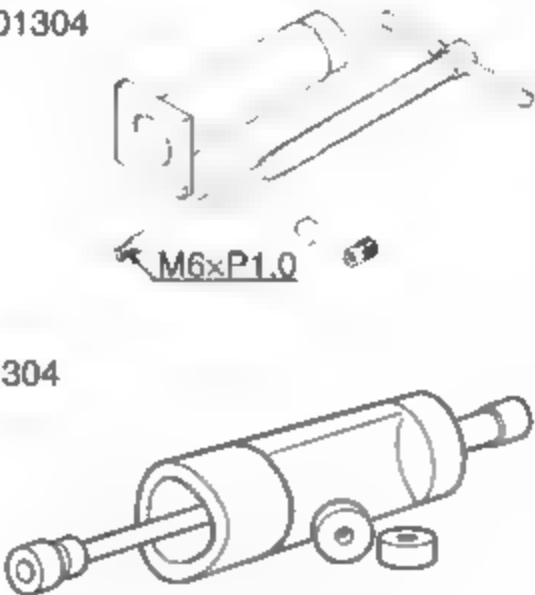
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442		4-70, 4-70, 4-70
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703	90890-01437  YM-A8703 	4-71
Rod puller attachment (M10 long) 90890-01578 Universal damping rod bleeding tool set YM-A8703	90890-01578  YM-A8703 	4-71
Ring nut wrench 90890-01268 Spanner wrench YU-01268		4-76
Engine alignment tool 90890-11097 Engine alignment tool YM-11097		4-84, 4-84, 4-86
Drive chain cut & rivet tool 90890-01550 Drive chain cut & rivet tool YM-01550		4-91
Compression gauge extension 122mm 90890-04136 Compression gauge extension 122mm YM-04136		5-8

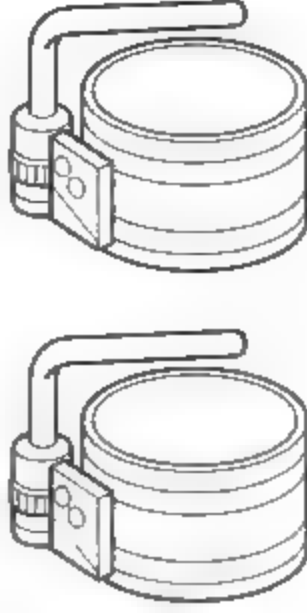
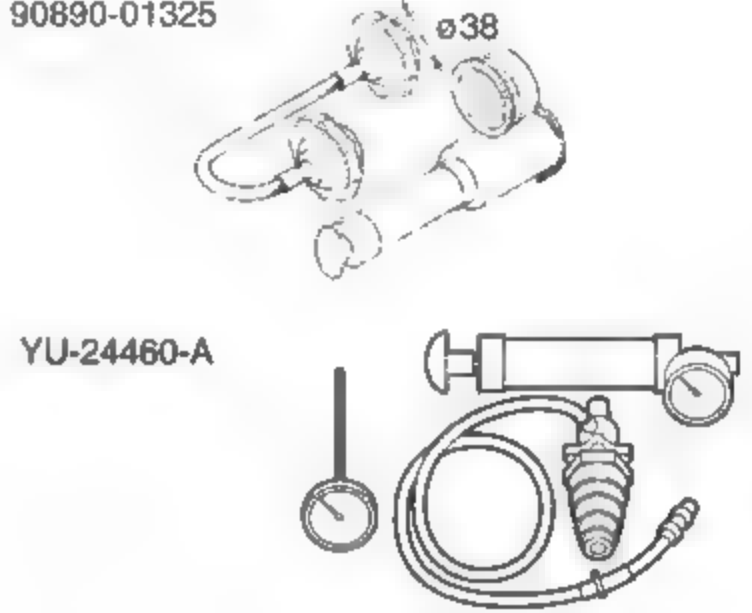
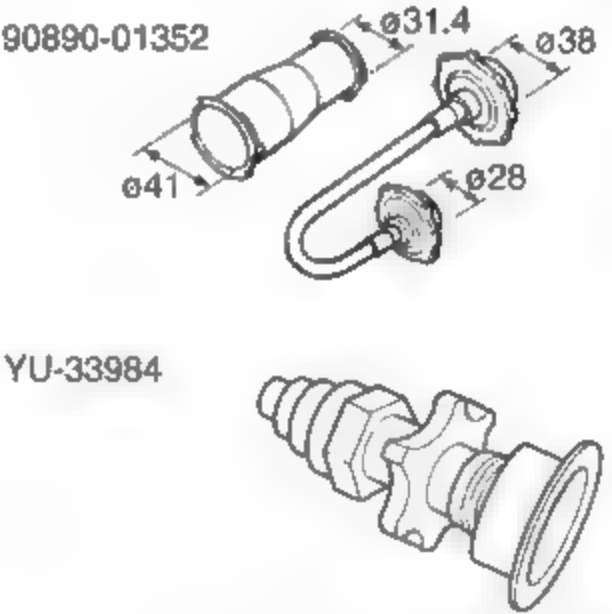
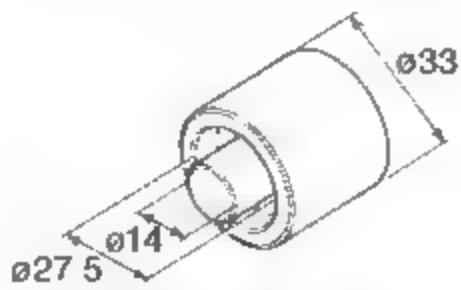
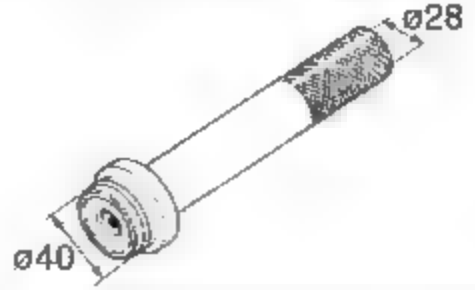
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Compression gauge 90890-03081 Engine compression tester YU-33223		5-8
Rotor holding tool 90890-01235 Universal magneto and rotor holder YU-01235		5-23, 5-26
Yamaha bond No. 1215 90890-85505 Three bond No. 1215®		5-29, 5-47, 5-72, 5-74
Valve spring compressor 90890-04200 Valve spring compressor YM-04019		5-38, 5-42
Valve spring compressor attachment (ø26) 90890-01243 Valve spring compressor attachment (ø26) YM-01253-1		5-38, 5-42
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-39
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117		5-39
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-39




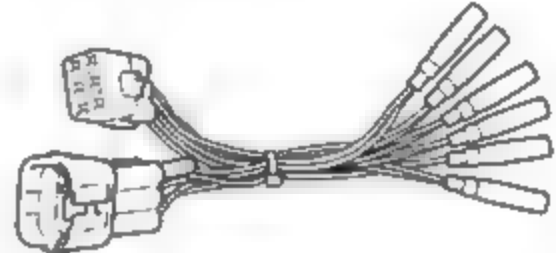
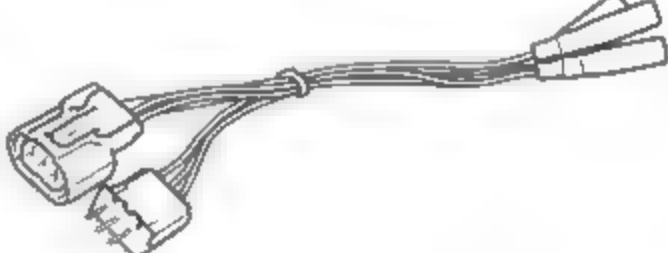
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Rotor holding tool 90890-04166 Rotor holding tool YM-04166		5-45, 5-45, 5-46, 5-46
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-45
Digital circuit tester (CD732) 90890-03243 Model 88 Multimeter with tachometer YU-A1927		5-50, 8-38, 8-39, 8-40, 8-41, 8-41, 8-42, 8-42, 8-43, 8-44, 8-44, 8-44, 8-45, 8-46, 8-46, 8-47, 8-47, 8-48, 8-49
Clutch holder 90890-04199 Universal clutch holder YM-91042	 YM-91042	5-56, 5-58
Piston pin puller set 90890-01304 Piston pin puller YU-01304	 90890-01304 YU-01304	5-77

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Piston ring compressor 90890-05158 Piston ring compressor YM-08037		5-84
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A		6-4, 6-4
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984		6-4
Mechanical seal installer ($\phi 33$) 90890-04132 Water pump seal installer ($\phi 33$) YM-33221-A		6-12
Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058		6-12

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Fuel injector pressure adapter 90890-03210 Fuel injector pressure adapter YU-03210		7-13
Fuel pressure adapter 90890-03176 Fuel pressure adapter YM-03176		7-14
Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487		8-42
Test harness- lean angle sensor (6P) 90890-03209 Test harness- lean angle sensor (6P) YU-03209		8-43
Test harness S- pressure sensor (3P) 90890-03207 Test harness S- pressure sensor (3P) YU-03207		8-46

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GENERAL SPECIFICATIONS

EAS20013

GENERAL SPECIFICATIONS

Model

Model

BVW1

Dimensions

Overall length

2370 mm (93.3 in)

Overall width

905 mm (35.6 in)

Overall height

1455 mm (57.3 in)

Wheelbase

1595 mm (62.8 in)

Ground clearance

240 mm (9.45 in)

Minimum turning radius

2.9 m (9.51 ft)

Weight

Curb weight

205 kg (452 lb)

Loading

Maximum load

189 kg (417 lb)

Riding capacity

2 person

ENGINE SPECIFICATIONS

EAS20014

ENGINE SPECIFICATIONS

Engine

Combustion cycle	4-stroke
Cooling system	Liquid cooled
Valve train	DOHC
Displacement	689 cm ³
Cylinder arrangement	Inline
Number of cylinders	2-cylinder
Bore × stroke	80.0 × 68.6 mm (3.15 × 2.70 in)
Compression ratio	11.5 : 1
Compression pressure (#1 cylinder)	765–985 kPa/355 r/min (7.7–9.9 kgf/cm ² /355 r/min, 108.9–140.2 psi/355 r/min)
Compression pressure (#2 cylinder)	687–884 kPa/355 r/min (6.9–8.8 kgf/cm ² /355 r/min, 97.8–125.8 psi/355 r/min)

Fuel

Recommended fuel	Unleaded gasoline (E10 acceptable)
Minimum research octane	90
Fuel tank capacity	16 L (4.2 US gal, 3.5 Imp.gal)
Fuel reserve amount	4.3 L (1.14 US gal, 0.95 Imp.gal)

Engine oil

Recommended brand	YAMALUBE
SAE viscosity grades	10W-40, 10W-50, 15W-40, 20W-40 or 20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Lubrication system	Wet sump
Engine oil quantity	
Oil change	2.30 L (2.43 US qt, 2.02 Imp.qt)
With oil filter removal	2.60 L (2.75 US qt, 2.29 Imp.qt)
Quantity (disassembled)	3.00 L (3.17 US qt, 2.64 Imp.qt)

Oil filter

Oil filter type	Cartridge
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Oil pump

Oil pressure	280.0 kPa/5000 r/min (2.80 kgf/cm ² /5000 r/min, 40.6 psi/5000 r/min)
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Cooling system

Coolant quantity	
Radiator (including all routes)	1.60 L (1.69 US qt, 1.41 Imp.qt)
Coolant reservoir (up to the maximum level mark)	0.25 L (0.26 US qt, 0.22 Imp.qt)
Radiator cap valve opening pressure	107.9–137.3 kPa (1.08–1.37 kgf/cm ² , 15.6–19.9 psi)
Cooling system leak test pressure	137.3 kPa (1.37 kgf/cm ² , 19.9 psi)
Thermostat	
Valve opening temperature	80.0–84.0 °C (176.00–183.20 °F)
Valve full open temperature	95.0 °C (203.00 °F)

ENGINE SPECIFICATIONS

Spark plug(s)	
Manufacturer/model	NGK/LMAR8A-9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)
Cylinder head	
Warping limit	0.10 mm (0.0039 in)
Camshaft	
Camshaft cap inside diameter	22.000–22.021 mm (0.8661–0.8670 in)
Camshaft journal diameter	21.959–21.972 mm (0.8645–0.8650 in)
Camshaft-journal-to-camshaft-cap clearance limit	0.080 mm (0.0032 in)
Camshaft lobe dimensions	
Lobe height limit (Intake)	35.510 mm (1.3980 in)
Lobe height limit (Exhaust)	35.610 mm (1.4020 in)
Camshaft runout limit	0.030 mm (0.0012 in)
Valve, valve seat, valve guide	
Valve clearance (cold)	
Intake	0.11–0.20 mm (0.0043–0.0079 in)
Exhaust	0.24–0.30 mm (0.0094–0.0118 in)
Valve dimensions	
Valve seat contact width limit (intake)	1.6 mm (0.06 in)
Valve seat contact width limit (exhaust)	1.6 mm (0.06 in)
Valve stem diameter limit (intake)	4.445 mm (0.1750 in)
Valve stem diameter limit (exhaust)	4.430 mm (0.1744 in)
Valve guide inside diameter (intake)	4.500–4.512 mm (0.1772–0.1776 in)
Valve guide inside diameter (exhaust)	4.500–4.512 mm (0.1772–0.1776 in)
Valve-stem-to-valve-guide clearance limit (intake)	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance limit (exhaust)	0.100 mm (0.0039 in)
Valve stem runout	0.020 mm (0.0008 in)
Valve spring	
Free length limit (intake)	38.29 mm (1.51 in)
Free length limit (exhaust)	39.32 mm (1.55 in)
Cylinder	
Bore	80.000–80.010 mm (3.1496–3.1500 in)
Wear limit	80.060 mm (3.1520 in)
Piston	
Diameter	79.970–79.985 mm (3.1484–3.1490 in)
Measuring point (from piston skirt bottom)	8.0 mm (0.31 in)
Piston-to-cylinder clearance	0.015–0.040 mm (0.0006–0.0016 in)
Piston pin bore inside diameter limit	18.045 mm (0.7104 in)
Piston pin outside diameter limit	17.970 mm (0.7075 in)
Piston ring	
Top ring	
End gap limit	0.50 mm (0.0197 in)

ENGINE SPECIFICATIONS

Side clearance limit 2nd ring	0.115 mm (0.0045 in)
End gap limit	0.80 mm (0.0315 in)
Side clearance limit	0.115 mm (0.0045 in)
Connecting rod	
Oil clearance	0.027–0.051 mm (0.0011–0.0020 in)
Bearing color code	
Code 1	Blue
Code 2	Black
Code 3	Brown
Code 4	Green
Crankshaft	
Runout limit	0.030 mm (0.0012 in)
Journal oil clearance	0.018–0.042 mm (0.0007–0.0017 in)
Bearing color code	
Model identification color	Pink
Code -1	Purple
Code 0	White
Code 1	Blue
Code 2	Black
Code 3	Brown
Balancer	
Balancer shaft runout limit	0.030 mm (0.0012 in)
Balancer shaft journal to balancer shaft bearing clearance	0.020–0.054 mm (0.0008–0.0021 in)
Bearing color code	
Code 1	Blue
Code 2	Black
Code 3	Brown
Code 4	Green
Code 5	Yellow
Clutch	
Clutch type	Wet, multiple-disc
Clutch lever free play	5.0–10.0 mm (0.20–0.39 in)
Friction plate 2 thickness	2.92–3.08 mm (0.115–0.121 in)
Wear limit	2.82 mm (0.111 in)
Plate quantity	5 pcs
Friction plate 1 thickness	2.90–3.10 mm (0.114–0.122 in)
Wear limit	2.80 mm (0.110 in)
Plate quantity	2 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Warping limit	0.10 mm (0.004 in)
Plate quantity	6 pcs
Clutch spring free length limit	47.50 mm (1.87 in)
Drivetrain	
Primary reduction ratio	1.925 (77/40)
Transmission type	Constant mesh 6-speed

ENGINE SPECIFICATIONS

Gear ratio	
1st	2.846 (37/13)
2nd	2.125 (34/16)
3rd	1.632 (31/19)
4th	1.300 (26/20)
5th	1.091 (24/22)
6th	0.964 (27/28)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
Secondary reduction ratio	3.067 (46/15)
Shifting mechanism	
Installed shift rod length	273.0–275.0 mm (10.75–10.83 in)
Air filter	
Air filter element	Oil-coated paper element
Fuel injector	
Resistance	12.0 Ω
Idling condition	
Engine idling speed	1250–1450 r/min
O ₂ feedback control	Active
Coolant temperature	85–105 °C (185–221 °F)
Difference in vacuum pressure between the cylinders	0 kPa–1.3 kPa (0 mmHg–10 mmHg, 0 inHg–0.4 inHg)
CO%	0.0–2.0 %
Fuel line pressure (at idle)	300–390 kPa (3.0–3.9 kgf/cm ² , 43.5–56.6 psi)
Throttle grip free play	3.0–5.0 mm (0.12–0.20 in)

CHASSIS SPECIFICATIONS

EAS20015

CHASSIS SPECIFICATIONS

Chassis

Caster angle	27.0 °
Trail	105 mm (4.1 in)

Front wheel

Wheel type	Spoke wheel
Rim size	21 × 1.85
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)
Wheel axle bending limit	0.25 mm (0.01 in)

Rear wheel

Wheel type	Spoke wheel
Rim size	18M/C × MT4.00
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)
Wheel axle bending limit	0.25 mm (0.01 in)

Front tire

Type	With tube
Size	90/90-21 M/C 54V M+S A
Manufacturer/model	PIRELLI/SCORPION RALLY STR

Rear tire

Type	With tube
Size	150/70 R18 M/C 70V M+S
Manufacturer/model	PIRELLI/SCORPION RALLY STR

Tire air pressure (measured on cold tires)

Front	220 kPa (2.20 kgf/cm ² , 32 psi)
Rear	250 kPa (2.50 kgf/cm ² , 36 psi)

Front brake

Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness limit	1.0 mm (0.04 in)
Master cylinder inside diameter	16.00 mm (0.63 in)
Caliper cylinder inside diameter (Left)	28.00 mm, 28.00 mm (1.10 in, 1.10 in)
Caliper cylinder inside diameter (Right)	28.00 mm, 28.00 mm (1.10 in, 1.10 in)
Specified brake fluid	DOT 4

Rear brake

Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness limit	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	34.00 mm (1.34 in)
Specified brake fluid	DOT 4

CHASSIS SPECIFICATIONS

Front suspension

Shock absorber	Hydraulic damper
Fork spring free length limit	413.5 mm (16.28 in)
Inner tube bending limit	0.2 mm (0.01 in)
Recommended oil	Yamaha Suspension Oil 01
Quantity (left)	624.0 cm ³ (21.10 US oz, 22.01 Imp.oz)
Quantity (right)	624.0 cm ³ (21.10 US oz, 22.01 Imp.oz)
Level (left)	85 mm (3.3 in)
Level (right)	85 mm (3.3 in)
Rebound damping	
Unit for adjustment	Click
Adjustment value from the start position (Soft)	17
Adjustment value from the start position (STD)	17
Adjustment value from the start position (Hard)	0
Compression damping	
Unit for compression damping adjustment	Click
Adjustment value from the start position (Soft)	19
Adjustment value from the start position (STD)	11
Adjustment value from the start position (Hard)	0

Rear suspension

Shock absorber	Gas-hydraulic damper
Spring preload	
Unit for adjustment	Click
Adjustment value (Soft)	0
Adjustment value (STD)	10
Adjustment value (Hard)	24
Rebound damping	
Unit for adjustment	Click
Adjustment value from the start position (Soft)	23
Adjustment value from the start position (STD)	13
Adjustment value from the start position (Hard)	0
Compression damping	
Unit for adjustment	Click
Adjustment value from the start position (Soft)	18
Adjustment value from the start position (STD)	15
Adjustment value from the start position (Hard)	0

Drive chain

Size	525
Chain type	Sealed type
Number of links	122
Equipped stand	Sidestand
Drive chain slack (Sidestand)	43.0–48.0 mm (1.69–1.89 in)
Drive chain slack (Maintenance stand)	43.0–48.0 mm (1.69–1.89 in)
Drive chain slack limit	55.0 mm (2.17 in)
15-link length limit	239.3 mm (9.42 in)

ELECTRICAL SPECIFICATIONS

EAS20016

ELECTRICAL SPECIFICATIONS

Voltage

System voltage	12 V
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Ignition system

Ignition timing (B.T.D.C.)	8.0–12.0 °/1350 r/min
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Engine control unit

Model	TBDFBP
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Ignition coil

Primary coil resistance	1.19–1.61 Ω
Secondary coil resistance	8.50–11.50 k Ω

Lean angle sensor

Operating angle	65 °
Output voltage up to operating angle	0.4–1.4 V
Output voltage over operating angle	3.7–4.4 V

Charging system

Charging system	AC magneto
Standard output	14.0 V, 29.3 A at 5000 r/min

Rectifier/regulator

Regulated voltage (DC)	14.3–14.7 V
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Battery

Model	YTZ7S
Voltage, capacity	12 V, 6.0 Ah (10 HR)

Bulb wattage

Headlight	LED
Tail/brake light	LED
Front turn signal/position light	LED
Rear turn signal light	LED
Auxiliary light	LED
License plate light	5.0 W
Meter lighting	LED

Indicator light

ABS warning light	LED
ABS OFF indicator light	LED

Starter motor

Brush overall length limit	6.5 mm (0.26 in)
Mica undercut (depth)	0.70 mm (0.03 in)

Fuel sender unit

Sender unit resistance (full)	12.0–15.0 Ω
Sender unit resistance (empty)	118.0–122.0 Ω

ELECTRICAL SPECIFICATIONS

Fuel injection sensor

Crankshaft position sensor resistance	228–342 Ω
Intake air temperature sensor resistance	5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F)
Intake air temperature sensor resistance	290–390 Ω at 80 °C (290–390 Ω at 176 °F)
Intake air pressure sensor output voltage	3.59–3.67 V at 101.3 kPa (3.59–3.67 V at 1.01 kgf/cm ² , 3.59–3.67 V at 14.7 psi)
Coolant temperature sensor resistance	2513–2777 Ω at 20 °C (2513–2777 Ω at 68 °F)
Coolant temperature sensor resistance	210–221 Ω at 100 °C (210–221 Ω at 212 °F)

Fuse(s)

Main fuse	30.0 A
Headlight fuse	10.0 A
Signaling system fuse	7.5 A
Ignition fuse	10.0 A
Radiator fan motor fuse	10.0 A
Fuel injection system fuse	10.0 A
ABS control unit fuse	7.5 A
ABS motor fuse	30.0 A
ABS solenoid fuse	20.0 A
Accessory fuse	10.0 A
Auxiliary fuse	2.0 A
Backup fuse	7.5 A


TIGHTENING TORQUES

EAS20017

TIGHTENING TORQUES

EAS30016

ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Exhaust pipe nut	M8	4	20 N·m (2.0 kgf·m, 15 lb·ft)	
Exhaust pipe bracket bolt	M8	1	20 N·m (2.0 kgf·m, 15 lb·ft)	
Muffler bolt	M10	1	47 N·m (4.7 kgf·m, 35 lb·ft)	
Muffler joint bolt	M8	1	20 N·m (2.0 kgf·m, 15 lb·ft)	
Muffler protector bolt	M6	4	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Spark plug	M10	2	13 N·m (1.3 kgf·m, 9.6 lb·ft)	
Cylinder head cover bolt	M6	4	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Generator rotor bolt	M12	1	70 N·m (7.0 kgf·m, 52 lb·ft)	
Generator cover bolt	M6	2	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Generator cover bolt	M6	8	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Clutch boss nut	M20	1	95 N·m (9.5 kgf·m, 70 lb·ft)	Stake. 
Clutch spring bolt	M6	6	8 N·m (0.8 kgf·m, 5.9 lb·ft)	
Clutch cover bolt	M6	10	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Oil filter cartridge	M20	1	17 N·m (1.7 kgf·m, 13 lb·ft)	
Oil filter cartridge union bolt	M20	1	40 N·m (4.0 kgf·m, 30 lb·ft)	
Coolant drain bolt	M6	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Engine oil drain bolt	M14	1	43 N·m (4.3 kgf·m, 32 lb·ft)	

TIGHTENING TORQUES

EAS30017

CHASSIS TIGHTENING TORQUES

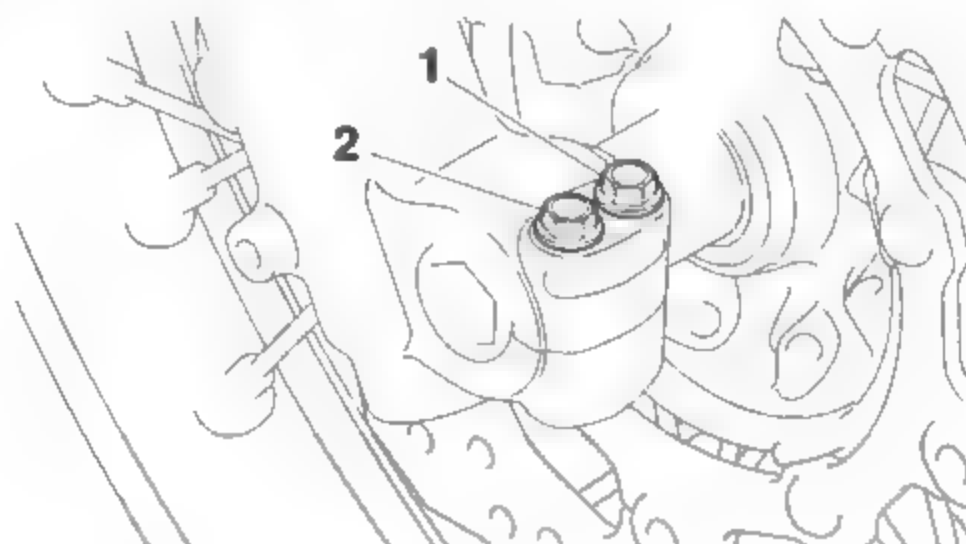
Item	Thread size	Q'ty	Tightening torque	Remarks
Front wheel axle	M18	1	72 N·m (7.2 kgf·m, 53 lb·ft)	
Front wheel axle pinch bolt	M8	2	21 N·m (2.1 kgf·m, 15 lb·ft)	See TIP.
Rear wheel sprocket nut	M10	1	80 N·m (8.0 kgf·m, 59 lb·ft)	
Rear wheel axle nut	M18	1	105 N·m (10.5 kgf·m, 77 lb·ft)	
Brake caliper bleed screw	M8	3	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Front brake caliper bolt	M10	4	40 N·m (4.0 kgf·m, 30 lb·ft)	
Upper handlebar holder bolt	M8	4	28 N·m (2.8 kgf·m, 21 lb·ft)	See TIP.
Lower handlebar holder nut	M10	2	32 N·m (3.2 kgf·m, 24 lb·ft)	
Clutch cable locknut	M8	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Lower bracket pinch bolt	M8	4	20 N·m (2.0 kgf·m, 15 lb·ft)	See TIP.
Upper bracket pinch bolt	M8	4	23 N·m (2.3 kgf·m, 17 lb·ft)	See TIP.
Steering stem nut	M22	1	150 N·m (15 kgf·m, 111 lb·ft)	
Drive sprocket nut	M22	1	110 N·m (11 kgf·m, 81 lb·ft)	

TIP

Front wheel axle pinch bolt

Tighten the pinch bolt to specification in order

Pinch bolt "1" → Pinch bolt "2" → Pinch bolt "1"



TIP

Upper handlebar holder bolt

1. Tighten the upper handlebar holder bolts less than 20 N·m (2.0 kgf·m, 15 lb·ft) temporarily, and adjust the handlebar position.
2. Tighten the upper handlebar holder bolt on the front side, and then on the rear side to specified torque.

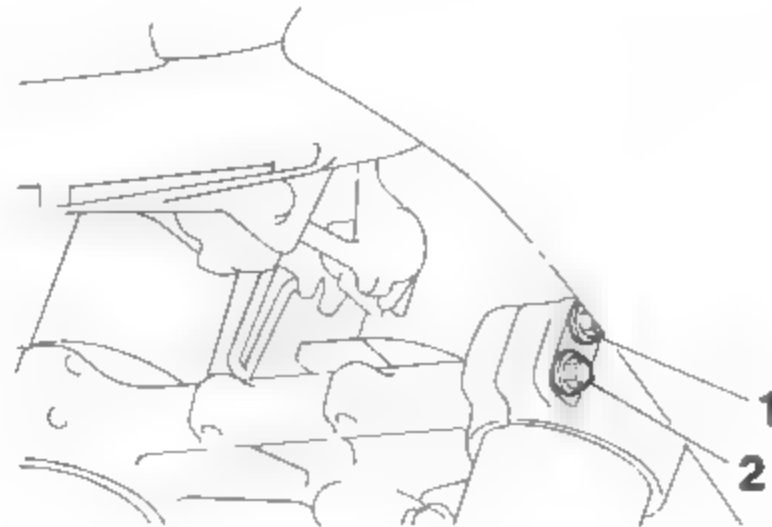
TIGHTENING TORQUES

TIP

Lower bracket pinch bolt

Tighten the pinch bolt to specification in order

Pinch bolt "1" → Pinch bolt "2" → Pinch bolt "1" → Pinch bolt "2"

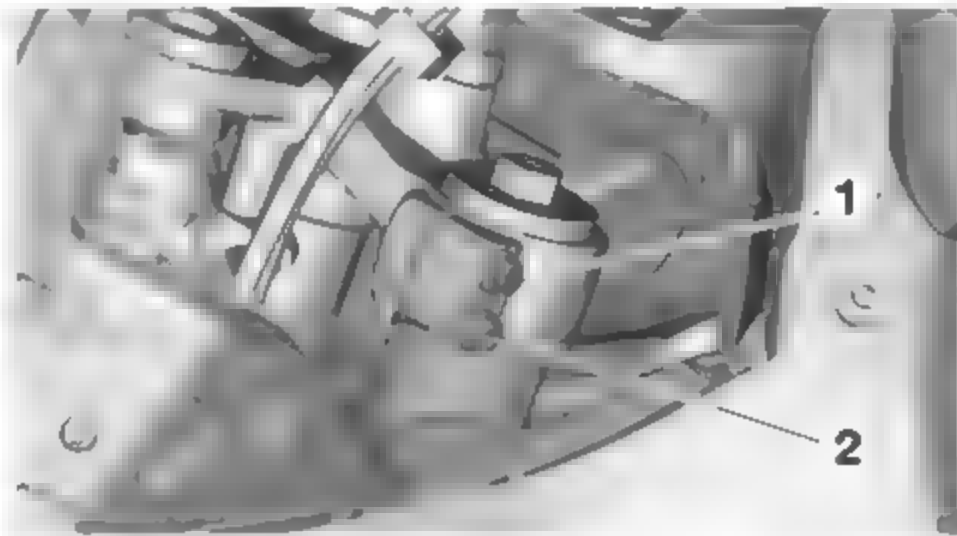


TIP

Upper bracket pinch bolt

Tighten the pinch bolt to specification in order

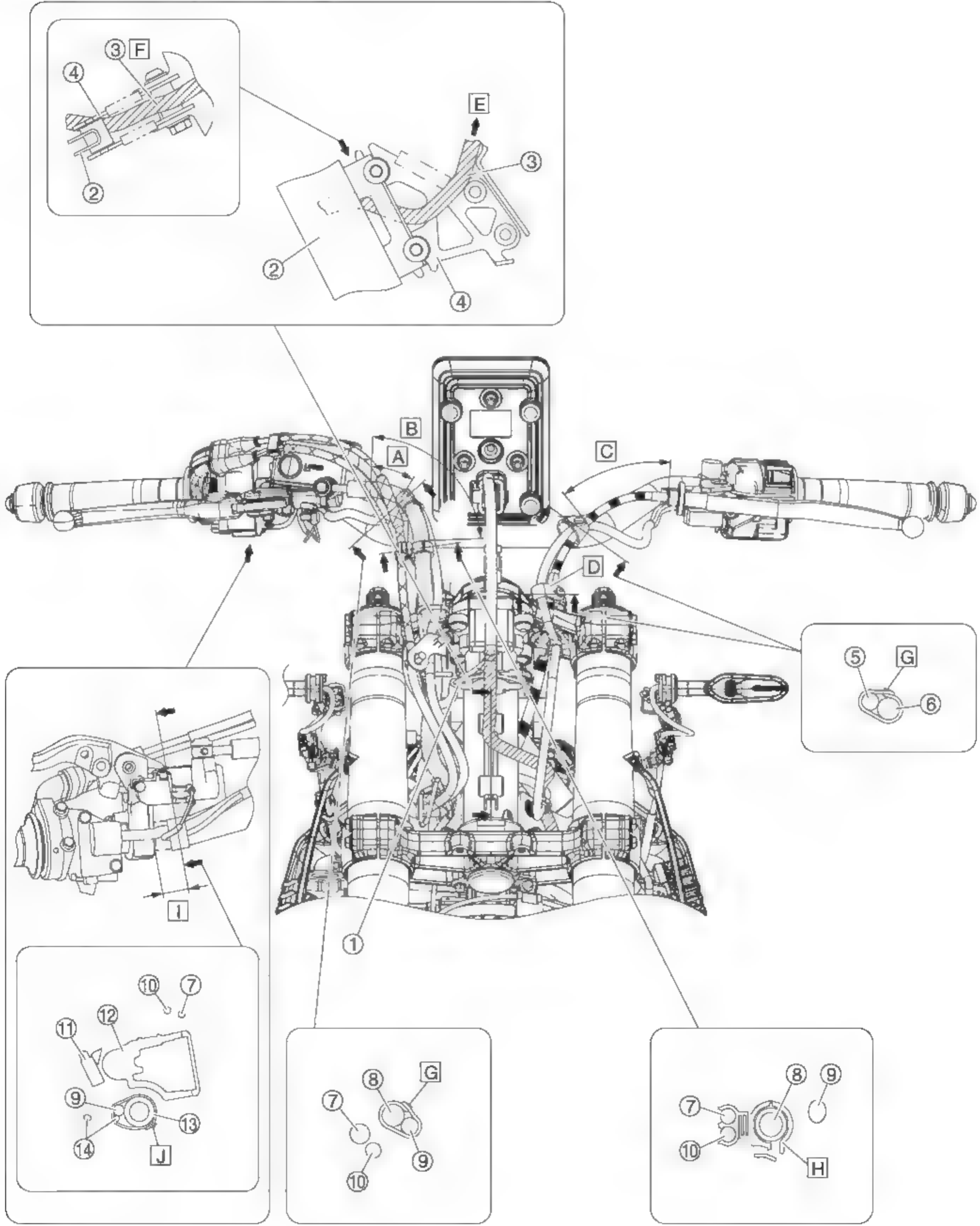
Pinch bolt "1" → Pinch bolt "2" → Pinch bolt "1" → Pinch bolt "2"



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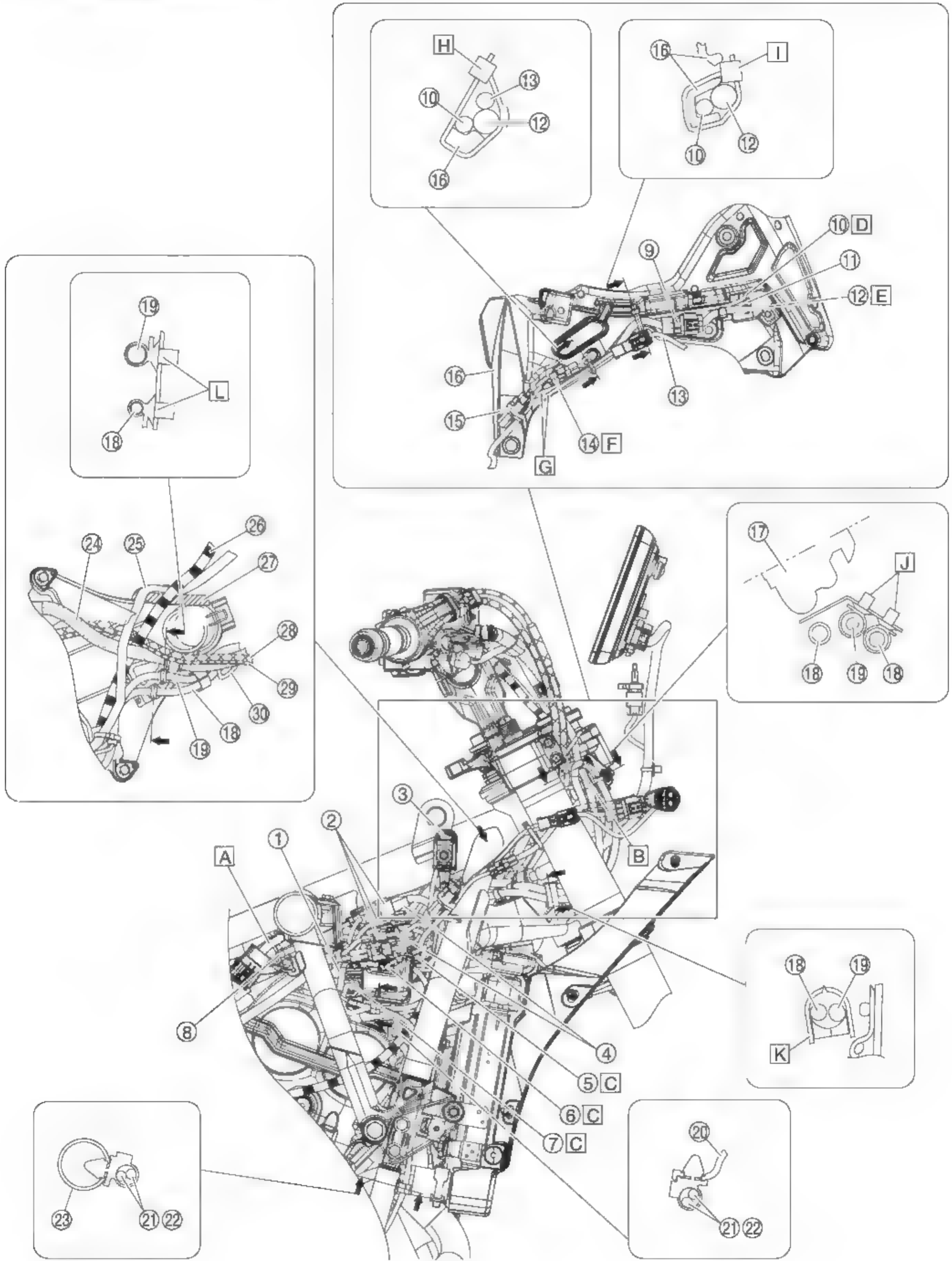
CABLE ROUTING

Handlebar (front view)



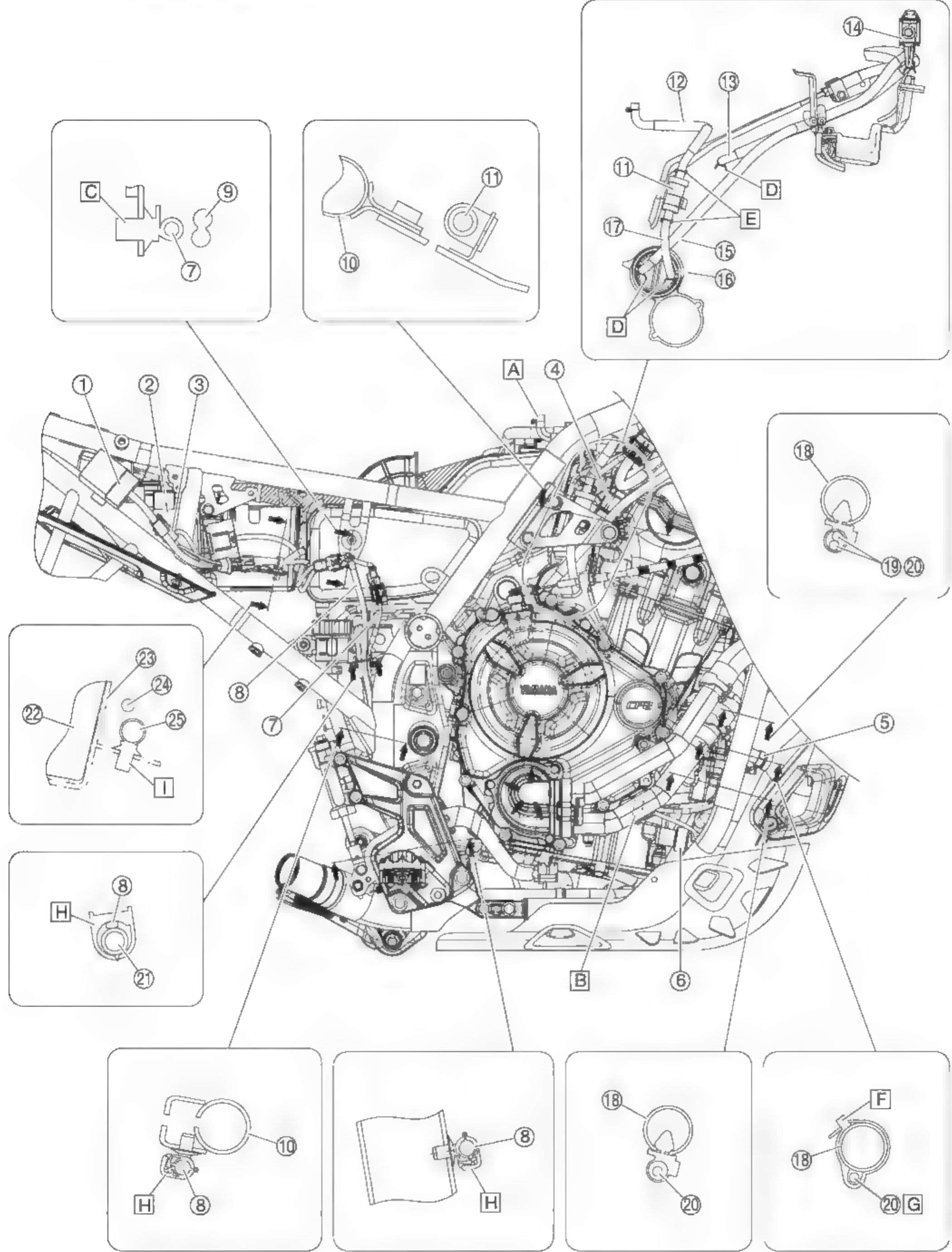
1. Main switch lead
2. Frame
3. Wire harness
4. Headlight stay
5. Clutch cable
6. Handlebar switch lead (left)
7. Throttle cable (accelerator cable)
8. Front brake hose (front brake master cylinder to hydraulic unit)
9. Handlebar switch lead (right)
10. Throttle cable (decelerator cable)
11. Front brake light switch
12. Front brake master cylinder assembly
13. Handlebar
14. Front brake light switch lead
 - A. 25–35 mm (0.98–1.38 in)
 - B. 90–100 mm (3.54–3.94 in)
 - C. 65–75 mm (2.56–2.95 in)
 - D. Fasten the left handlebar switch lead and clutch cable with the band. Position the band to the upper edge of the clutch cable protector.
 - E. To meter assembly
 - F. Route the wire harness through the hole in the headlight stay.
 - G. Point the open ends of the band forward.
 - H. Face the catch of the holder rearward, and then engage the holder.
 - I. 15–25 mm (0.59–0.98 in)
 - J. Point the open ends of the band rearward.

Frame (front right side view)



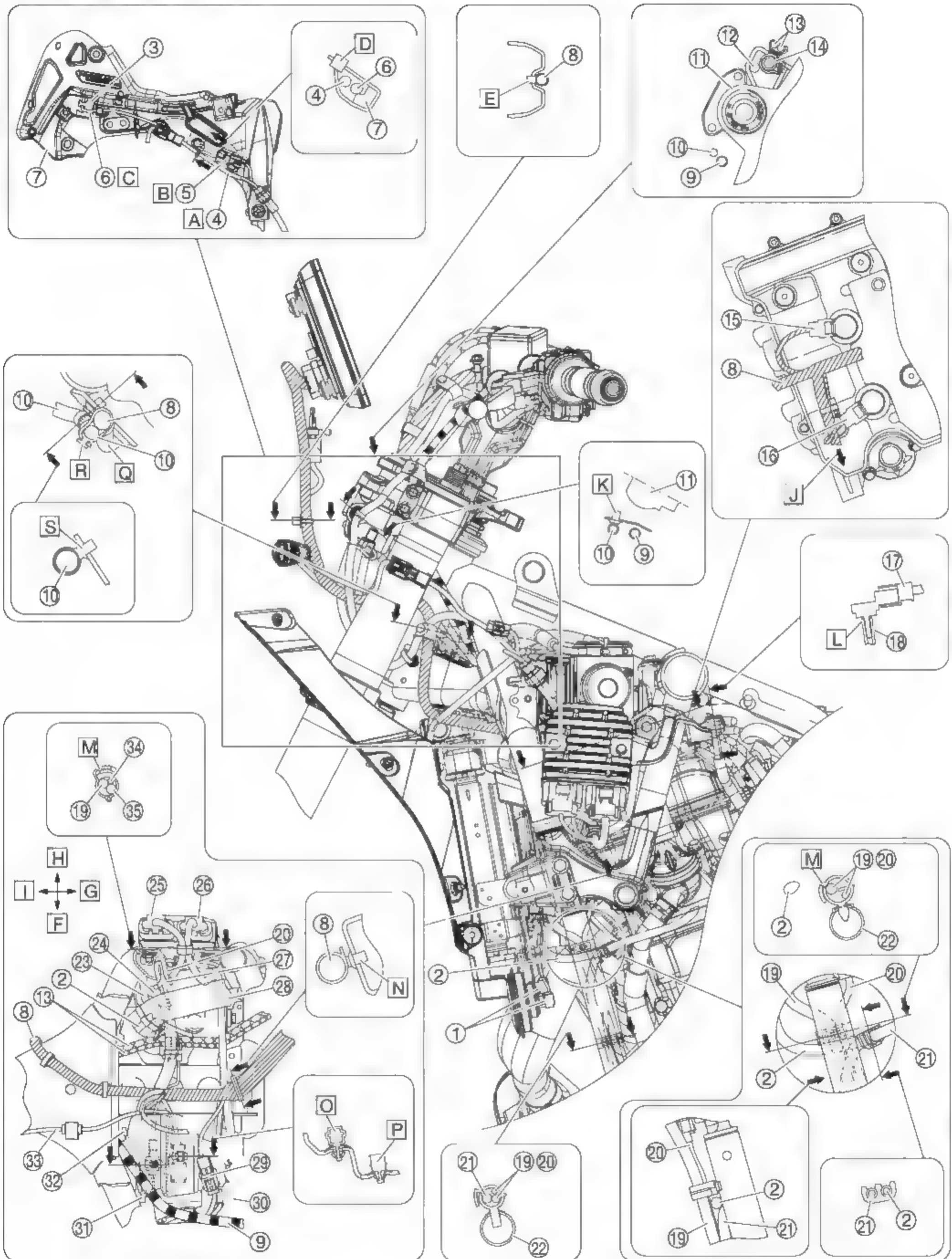
-
1. Oil pressure switch connector
 2. Handlebar switch coupler (left/right)
 3. Purge cut valve solenoid
 4. Main switch coupler
 5. Radiator fan motor coupler
 6. Front wheel sensor coupler
 7. O₂ sensor coupler
 8. Brake pipe
 9. Headlight coupler
 10. USB port lead
 11. Headlight inner cover
 12. Headlight lead
 13. Front turn signal/position light lead (right)
 14. USB port coupler
 15. Accessory coupler (right)
 16. Windshield inner panel (right)
 17. Main switch
 18. Main switch lead
 19. Handlebar switch lead (right)
 20. Coupler holder
 21. O₂ sensor lead
 22. Oil pressure switch lead
 23. Down tube
 24. Front brake hose (front brake master cylinder to hydraulic unit)
 25. Handlebar switch lead (left)
 26. Clutch cable
 27. Wire harness
 28. Throttle cable (accelerator cable)
 29. Throttle cable (decelerator cable)
 30. Cable guide
 - A. Route the sub-wire harness over the brake pipes and under the frame.
 - B. Route the main switch lead outside of the bracket.
 - C. Insert the projection on the coupler into the hole in the coupler holder.
 - D. Route the USB port lead through the upper hole in the headlight inner cover.
 - E. Route the headlight lead through the lower hole in the headlight inner cover.
 - F. Fit the USB port coupler into the guide on the windshield inner panel (right).
 - G. Route the front turn signal/position light lead (right) and headlight lead downward of the guide on the windshield inner panel (right) without routing through the guide.
 - H. Face the buckle of the plastic locking tie outward with the end pointing outward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
 - I. Face the buckle of the plastic locking tie upward with the end pointing outward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
 - J. Insert the projection on the handlebar switch lead holder and main switch lead holder into the hole in the bracket.
 - K. Face the catch of the holder downward, and then engage the holder at least three notches.
 - L. Insert the projection on the lead holder into the hole in the frame.

Frame and engine (right side view)



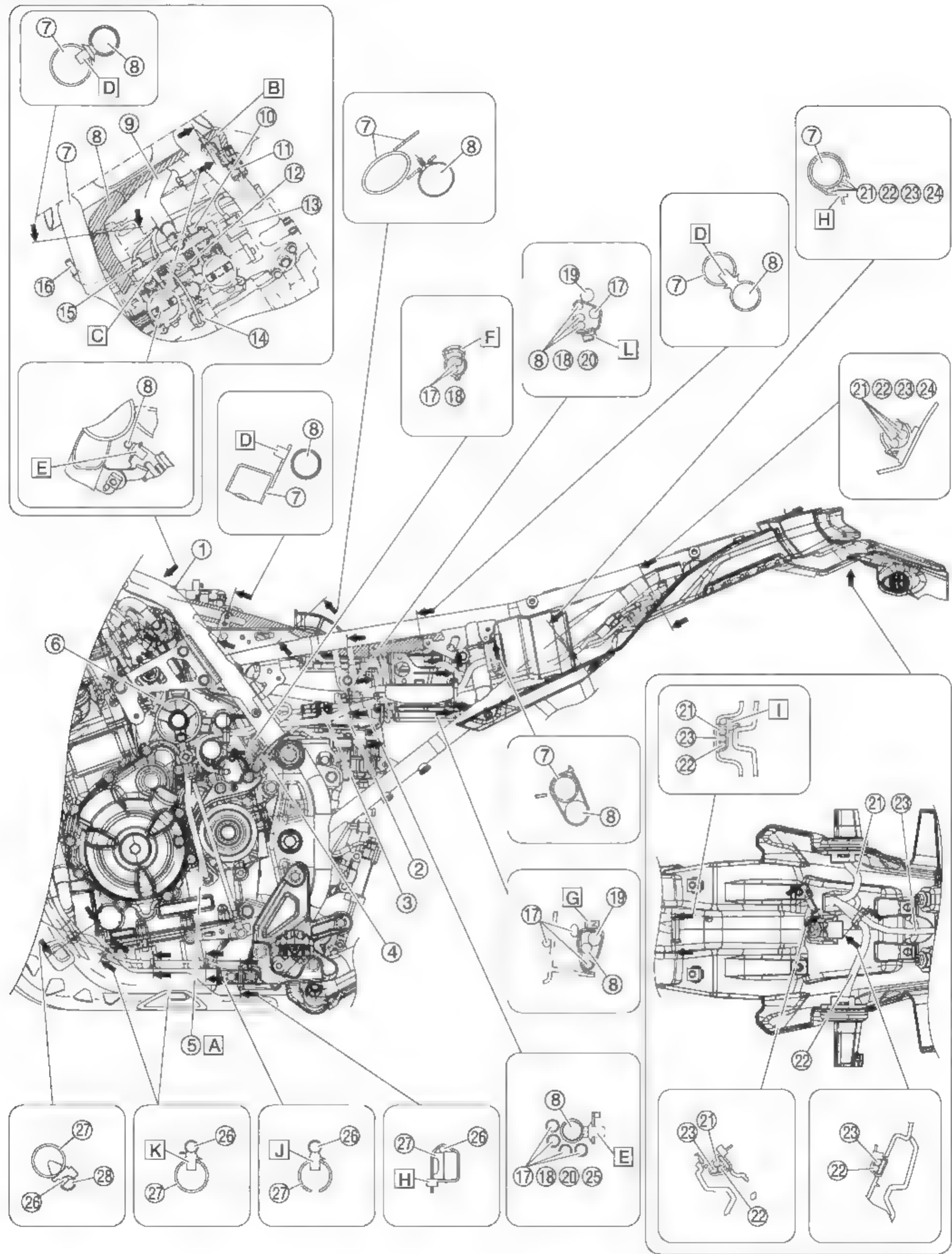
1. Relay unit
2. Radiator fan motor relay
3. Resistor coupler
4. Throttle position sensor
5. O₂ sensor
6. Oil pressure switch
7. Rear wheel sensor lead
8. Rear brake light switch lead
9. Rear brake light switch coupler
10. Frame
11. Rollover valve
12. Fuel tank breather/overflow hose (fuel tank to rollover valve)
13. Canister purge hose (purge cut valve solenoid to throttle body)
14. Purge cut valve solenoid
15. Canister purge hose
16. Canister
17. Fuel tank breather/overflow hose (rollover valve to canister)
18. Down tube
19. O₂ sensor lead
20. Oil pressure switch lead
21. Rear brake hose (rear brake master cylinder to hydraulic unit)
22. Battery
23. Battery box
24. Wire harness (to joint coupler)
25. Wire harness (to relays)
- A. Face the blue paint mark on the fuel tank breather hose outward.
- B. Fasten the oil pressure switch lead with the holder on the engine.
- C. Insert the projection on the wire harness holder into the hole in the frame.
- D. Point the end of the hose clamp downward.
- E. Point the end of the hose clamp inward.
- F. Fasten the oil pressure switch lead and down tube at the position of the O₂ sensor with the plastic locking tie. Face the buckle of the plastic locking tie outward rearward with the end pointing rearward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
- G. Route the oil pressure switch lead as shown in the illustration.
- H. Engage the clamp by at least three notches.
- I. Insert the projection on the wire harness holder into the hole in the battery box.

Frame (front left side view)



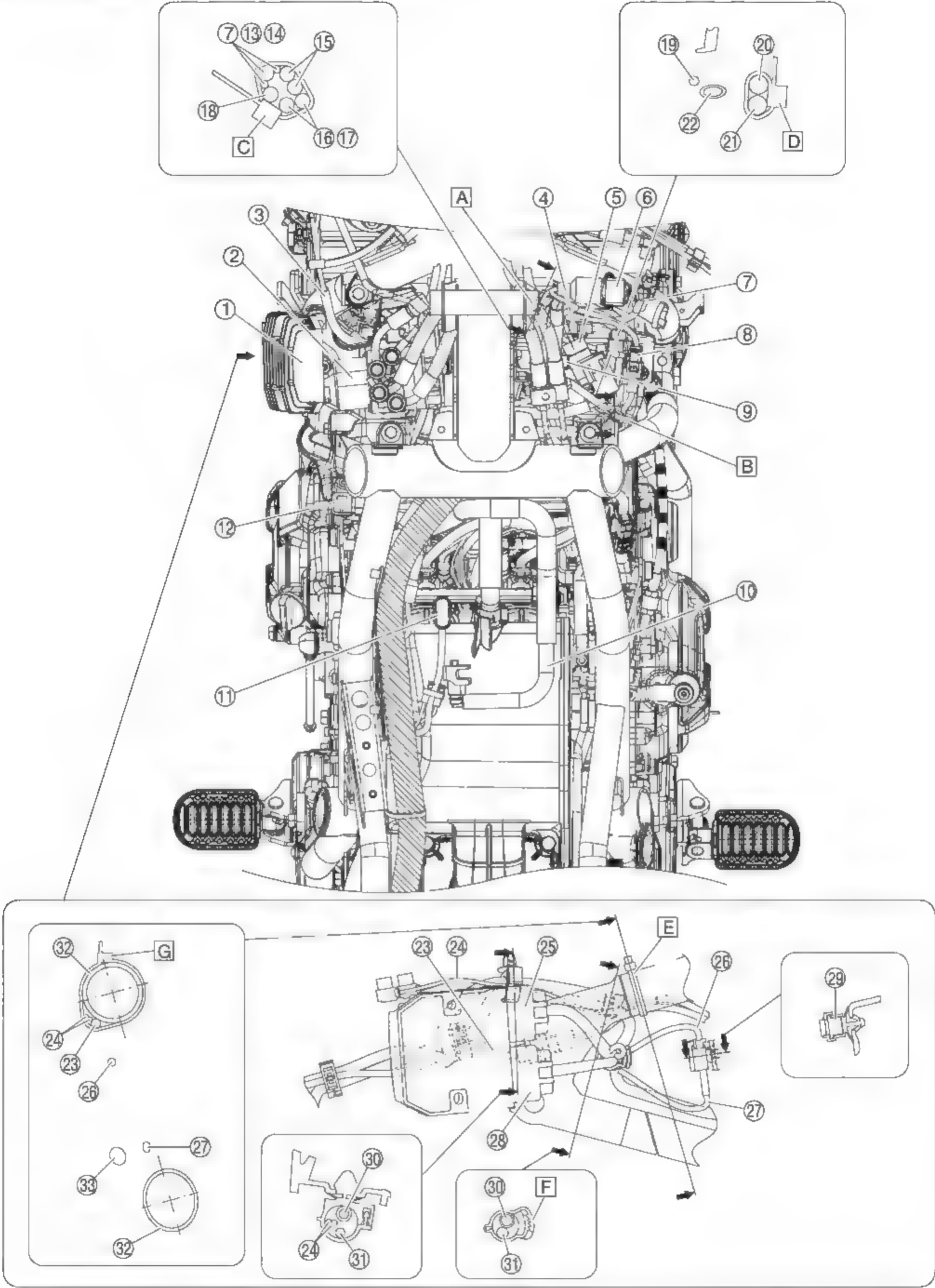
1. Horn connector
2. Coolant reservoir hose
3. Headlight inner cover
4. Front turn signal/position light lead (left)
5. "ABS ON" button coupler
6. "ABS ON" button lead
7. Windshield inner panel (left)
8. Wire harness
9. Clutch cable
10. Handlebar switch lead (left)
11. Main switch
12. Handlebar switch lead (right)
13. Throttle cables
14. Front brake hose (front brake master cylinder to hydraulic unit)
15. Ignition coil #2 coupler
16. Ignition coil #1 coupler
17. Intake air pressure sensor coupler
18. Intake air pressure sensor hose
19. Stator coil lead
20. Sidestand switch lead
21. Coolant reservoir breather hose
22. Down tube
23. Wire harness (to front turn signal/position light, "ABS ON" button, and accessory coupler)
24. Wire harness (to hydraulic unit)
25. Stator coil coupler (gray)
26. Rectifier/regulator coupler (black)
27. Wire harness (to horn)
28. Radiator inlet hose
29. O₂ sensor coupler
30. Oil pressure switch lead
31. Wire harness (to headlight, front turn signal/position light, USB port, and accessory coupler)
32. Radiator fan motor lead
33. Front wheel sensor lead
34. Crankshaft position sensor lead
35. Wire harness (to rectifier/regulator)
- A. Route the front turn signal/position light lead (left) downward of the guide on the windshield inner panel (left) without routing through the guide.
- B. Fit the "ABS ON" button coupler into the guide on the windshield inner panel (left).
- C. Route the "ABS ON" button lead through the lower hole in the headlight inner cover.
- D. Face the buckle of the plastic locking tie outward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
- E. Insert the projection on the wire harness holder into the hole in the headlight inner cover.
- F. Right side
- G. Rearward
- H. Left side
- I. Forward
- J. To hydraulic unit
- K. Insert the projection on the handlebar switch lead (left) holder into the hole in the bracket.
- L. Install the intake air pressure sensor hose until it bottoms out the intake air pressure sensor.
- M. Engage the clamp by at least three notches
- N. Insert the projection on the wire harness holder into the hole in the frame.
- O. Insert the projection on the radiator fan motor coupler into the hole in the coupler holder.
- P. Insert the projection on the front wheel sensor coupler into the hole in the coupler holder
- Q. Route the wire harness between the handlebar switch lead (left) and frame.
- R. Point the open ends of the band outward.
- S. Insert the projection on the handlebar switch lead (left) holder into the hole in the frame.

Engine (left side view)



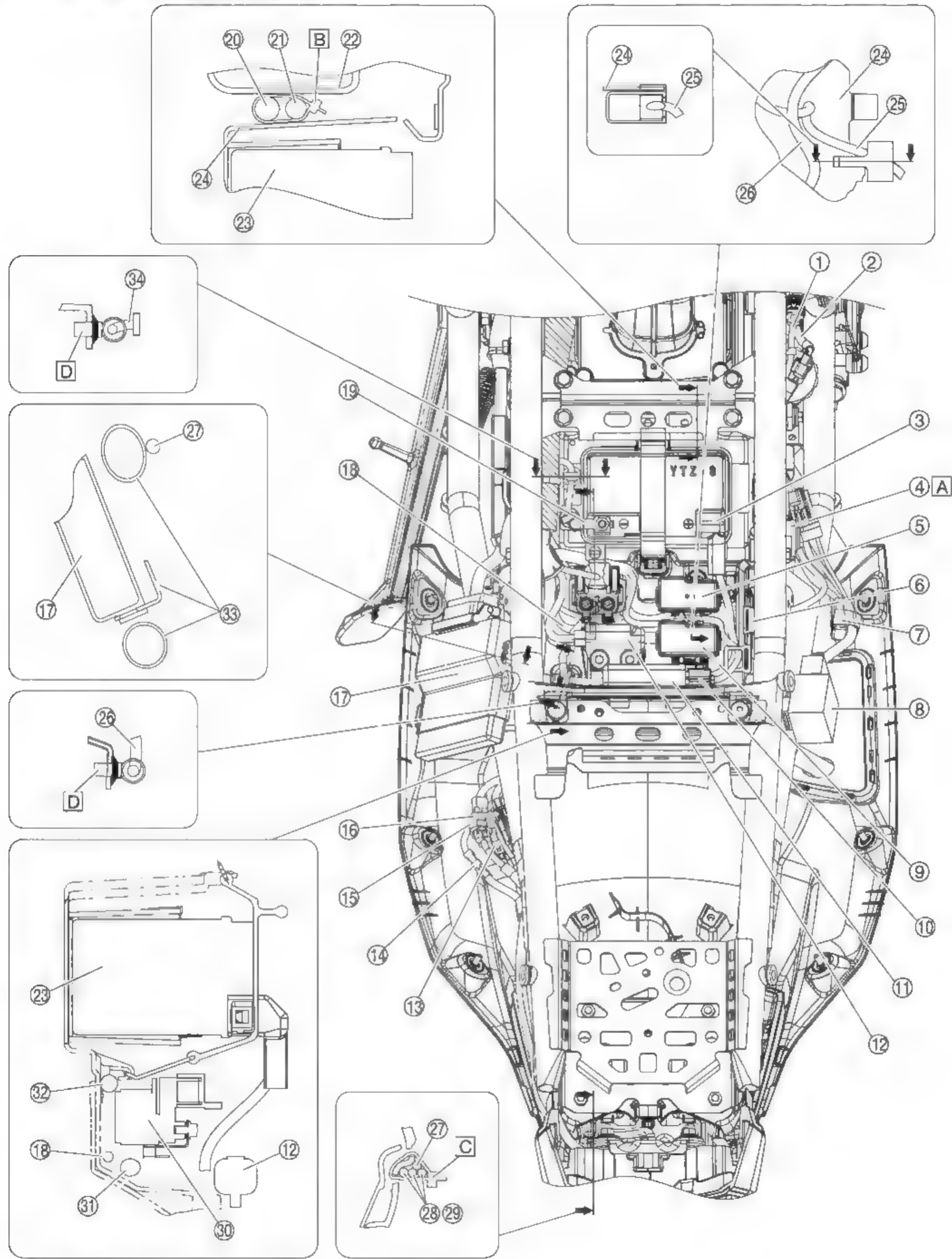
1. Fuel pump coupler
2. Shift sensor coupler
3. Gear position switch coupler
4. Engine ground lead terminal
5. Canister breather hose
6. Canister
7. Frame
8. Wire harness
9. Cylinder head breather hose
10. Fuel injector coupler (#2)
11. Sub-wire harness coupler
12. ISC (Idle Speed Control) unit coupler
13. Throttle position sensor coupler
14. Coolant temperature sensor coupler
15. Fuel injector coupler (#1)
16. Intake air pressure sensor hose
17. Starter motor lead
18. Gear position switch lead
19. ECU (Engine Control Unit) lead
20. Engine ground lead
21. Rear turn signal light lead (left)
22. Rear turn signal light lead (right)
23. License plate light lead
24. Tail/brake light lead
25. Shift sensor lead
26. Sidestand switch lead
27. Down tube
28. Coolant reservoir breather hose
- A. Face the white paint mark outward.
- B. Route the wire harness above the cylinder head breather hose. Install the wire harness coupler onto the bracket.
- C. Route the ISC (Idle Speed Control) unit lead and coolant temperature sensor lead under the fuel rail.
- D. Insert the projection on the wire harness holder into the hole in the frame.
- E. Insert the projection on the wire harness holder into the hole in the bracket.
- F. Engage the clamp by at least three notches.
- G. Face the buckle of the plastic band upward with the end pointing inward. Do not cut off the excess end of the plastic band.
- H. Face the buckle of the plastic locking tie downward with the end pointing downward.
- I. Face the buckle of the plastic band inward.
- J. Insert the projection on the sidestand switch lead holder into the hole in the down tube.
- K. Insert the projection on the sidestand switch lead holder into the hole in the down tube. Point the end of the plastic band outward, and cut off the excess end of the plastic band.
- L. Face the buckle of the plastic band downward with the end pointing inward. Do not cut off the excess end of the plastic band.

Frame (top view)



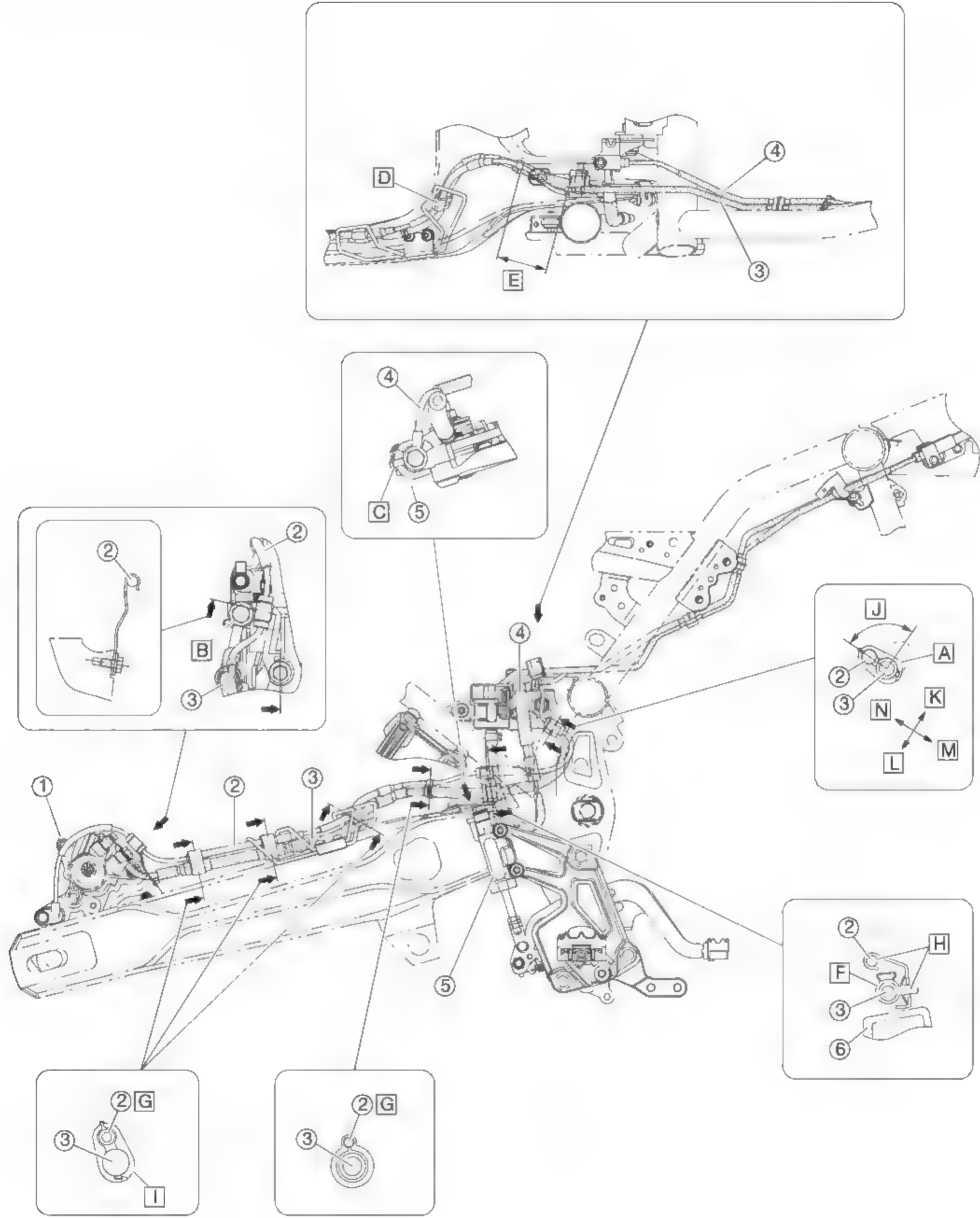
1. Rectifier/regulator
2. Hydraulic unit
3. Wire harness (to front turn signal/position light, "ABS ON" button, and accessory coupler)
4. Radiator fan motor coupler
5. Handlebar switch coupler (left/right)
6. Purge cut valve solenoid
7. Wire harness (to headlight, front turn signal/position light, USB port, and accessory coupler)
8. Main switch coupler
9. Front wheel sensor coupler
10. Fuel hose
11. Fuel pump coupler
12. Intake air pressure sensor
13. Front wheel sensor lead
14. Radiator fan motor lead
15. Main switch lead
16. Handlebar switch lead (left)
17. Handlebar switch lead (right)
18. Purge cut valve solenoid lead
19. O₂ sensor lead
20. Handlebar switch lead (left/right)
21. Main switch lead
22. Oil pressure switch lead
23. Sidestand switch lead
24. Horn lead
25. Stator coil coupler (gray)
26. Crankshaft position sensor lead
27. Wire harness (to crankshaft position sensor coupler)
28. Rectifier/regulator coupler (black)
29. Crankshaft position sensor coupler
30. Coolant reservoir hose
31. Stator coil lead
32. Frame
33. Rectifier/regulator lead
- A. Fasten the leads at the ends of wire harness protectors before the gray tape. Do not fasten the leads at the naked portion of the leads.
- B. Fasten the wire harness at the ends of wire harness protectors.
- C. Face the buckle of the plastic band rearward with the end pointing downward. Do not cut off the excess end of the plastic band.
- D. Face the buckle of the plastic band upward with the end pointing forward. Do not cut off the excess end of the plastic band.
- E. Position the plastic locking tie above the welded portion of the frame. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
- F. Engage the clamp by at least three notches.
- G. Face the buckle of the plastic band forward with the end pointing outward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.

Battery and rear fender (top view)



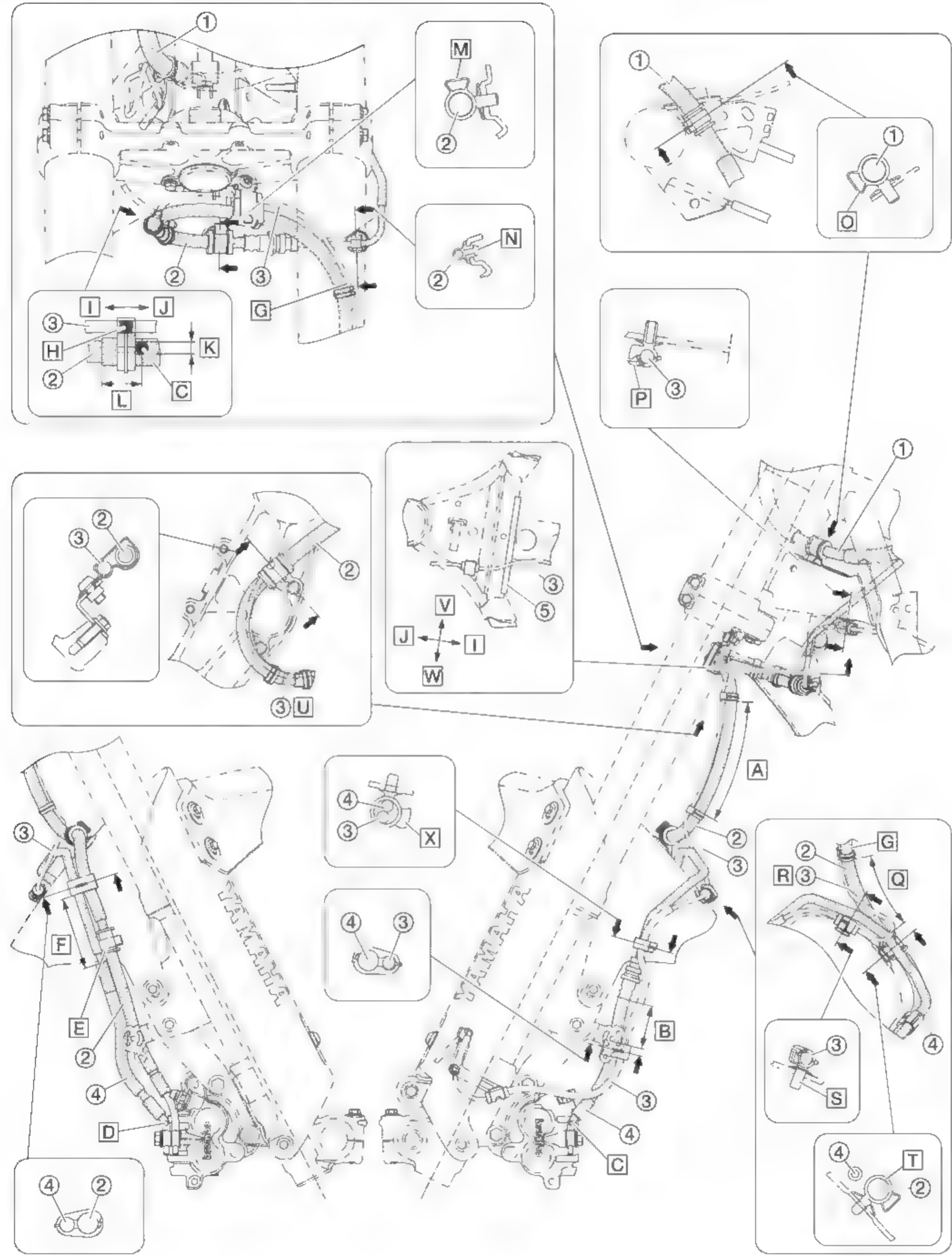
1. Rear wheel sensor lead
2. Rear brake light switch lead
3. Positive battery terminal
4. Joint coupler
5. Fuse box 1
6. Radiator fan motor relay
7. Resistor
8. Relay unit
9. Fuse box 2
10. YDT coupler
11. CCU (Communication Control Unit)
12. Lean angle sensor
13. Rear turn signal light coupler (left)
14. Rear turn signal light coupler (right)
15. Tail/brake light coupler
16. License plate light coupler
17. ECU (Engine Control Unit)
18. Starter motor lead
19. Negative battery terminal
20. Wire harness (to joint coupler)
21. Wire harness (to rear brake light switch/rear wheel sensor/relay unit)
22. Air filter case
23. Battery
24. Battery box
25. Wire harness (to CCU)
26. Positive battery lead
27. License plate light lead
28. Tail/brake light lead
29. Rear turn signal light lead (left/right)
30. Starter relay
31. Fuse box 2 lead
32. Fuse box 1 lead
33. Frame
34. Negative battery lead
- A. Insert the projection on the joint coupler holder into the hole in the battery box.
- B. Face the buckle of the plastic locking tie upward. Position the plastic locking tie to the white marks on the wire harness. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
- C. Face the buckle of the plastic locking tie upward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
- D. Insert the projection on the wire harness holder into the hole in the battery box.

Rear brake hose (right side view)



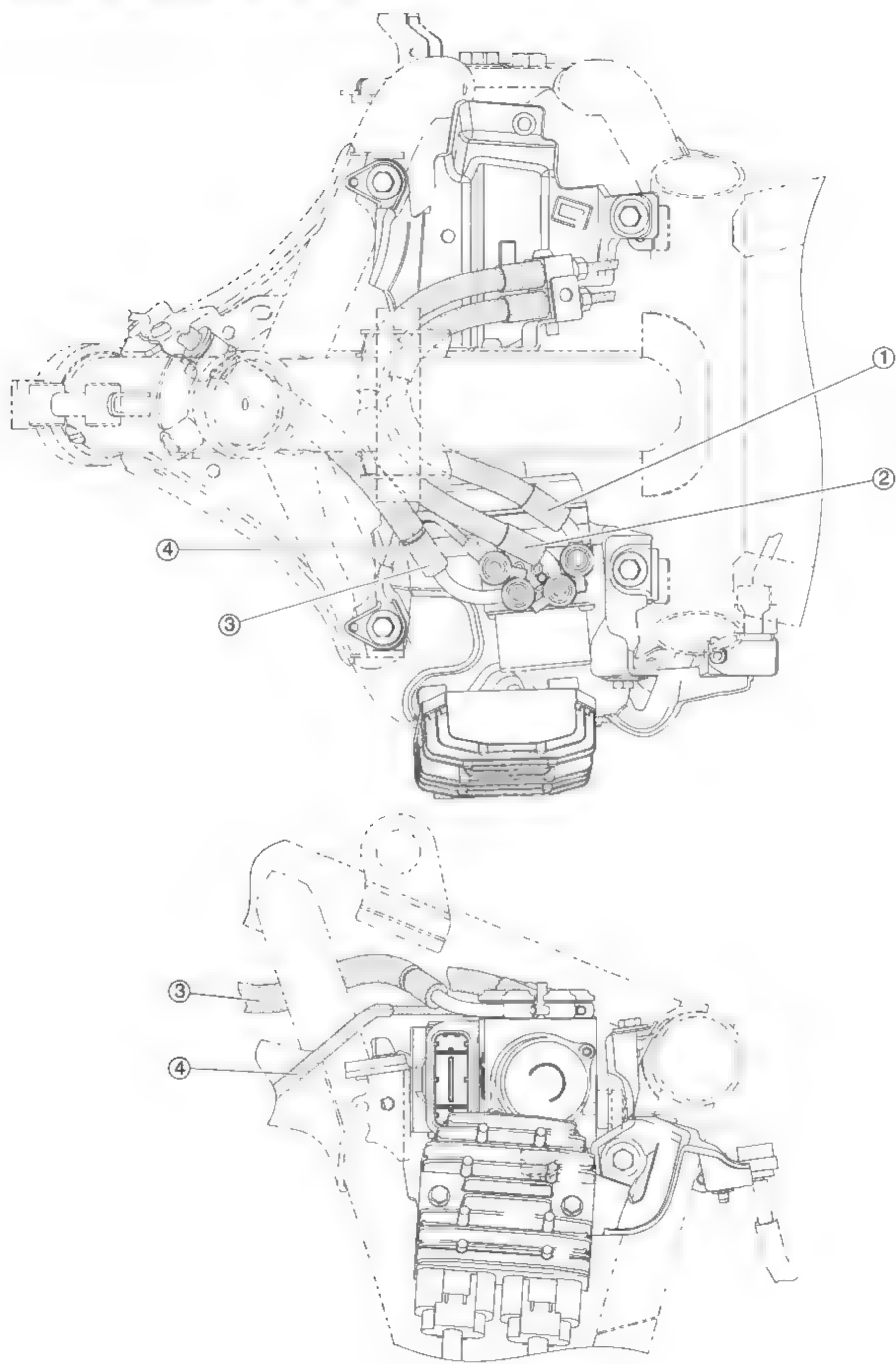
1. Rear brake caliper
2. Rear wheel sensor lead
3. Brake hose (hydraulic unit to rear brake caliper)
4. Brake hose (rear brake master cylinder to hydraulic unit)
5. Rear brake master cylinder
6. Swingarm
- A. Fasten the brake hose (hydraulic unit to rear brake caliper) and rear wheel sensor lead with the clamp. Position the clamp where the distance between the end of the brake hose and the edge of the clamp is 5–15 mm (0.20–0.59 in). Position the clamp in the range as shown in the illustration.
- B. Install the brake hose so that the pipe section of the brake hose contacts the stopper on the rear brake caliper.
- C. Install the brake hose so that the pin of the brake hose contacts the stopper on the rear brake master cylinder.
- D. Fasten the rear wheel sensor lead and the brake hose with the holder. Position the holder between the rear brake hose/lead guide wire.
- E. Position the holder within the 50–70 mm (1.97–2.76 in) range from the grommet of the brake hose as shown in the illustration.
- F. Face the catch of the holder upward.
- G. Route the rear wheel sensor lead over the brake hose.
- H. Install the grommet on the rear wheel sensor lead onto the bracket at first, and then install the holder.
- I. Fasten the brake hose at the hose protector portion with the clamp.
- J. 90°
- K. Upward
- L. Downward
- M. Inward
- N. Outward

Front brake hose (left and right side view)



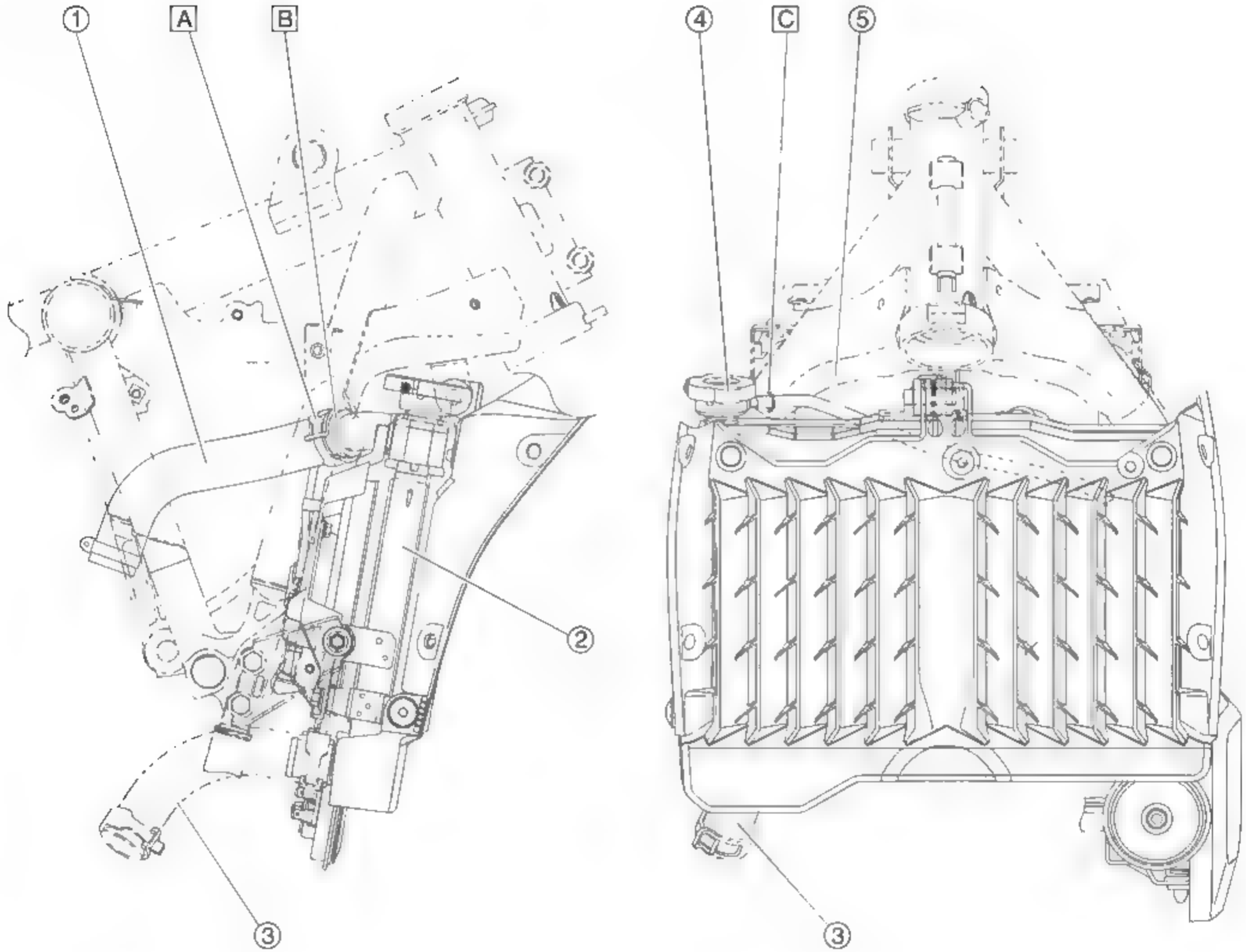
1. Brake hose (front brake master cylinder to hydraulic unit)
2. Brake hose (hydraulic unit to right front brake caliper)
3. Front wheel sensor lead
4. Brake hose (right front brake caliper to left front brake caliper)
5. Protector
 - A. 115–125 mm (4.53–4.92 in)
 - B. 39–49 mm (1.54–1.93 in)
 - C. White paint mark
 - D. Yellow paint mark
- E. Insert the holder into the hole in the front fender. Face the catch of the holder forward, and then close the holder until three clicks or more are heard.
- F. 69–79 mm (2.72–3.11 in)
- G. Route the front wheel sensor lead forward and outward of the brake hose.
- H. Fasten the front wheel sensor lead at the white tape with the holder.
- I. Rearward
- J. Forward
- K. Position the clamp protrusion in the range of white paint.
- L. Position the clamp within the center of white paint and end of brake hose protector.
- M. Insert the holder into the hole in the radiator cover. Face the catch of the holder upward, and then close the holder until three clicks or more are heard.
- N. Insert the holder into the hole in the radiator cover.
- O. Insert the holder into the hole in the frame. Face the catch of the holder forward, and then close the holder until three clicks or more are heard.
- P. Insert the holder into the hole in the frame. Face the catch of the holder outward, and then close the holder until three clicks or more are heard.
- Q. 75–85 mm (2.95–3.35 in)
- R. Route the front wheel sensor lead align the front brake hose.
- S. Insert the holder into the hole in the front fender.
- T. Insert the holder into the hole in the front fender. Face the catch of the holder forward, and then close the holder until three clicks or more are heard.
- U. Route the front wheel sensor lead over the brake hose.
- V. Left side
- W. Right side
- X. Insert the holder into the hole in the front fender. Face the catch of the holder rearward, and then close the holder until three clicks or more are heard.

Hydraulic unit assembly (top and left side view)



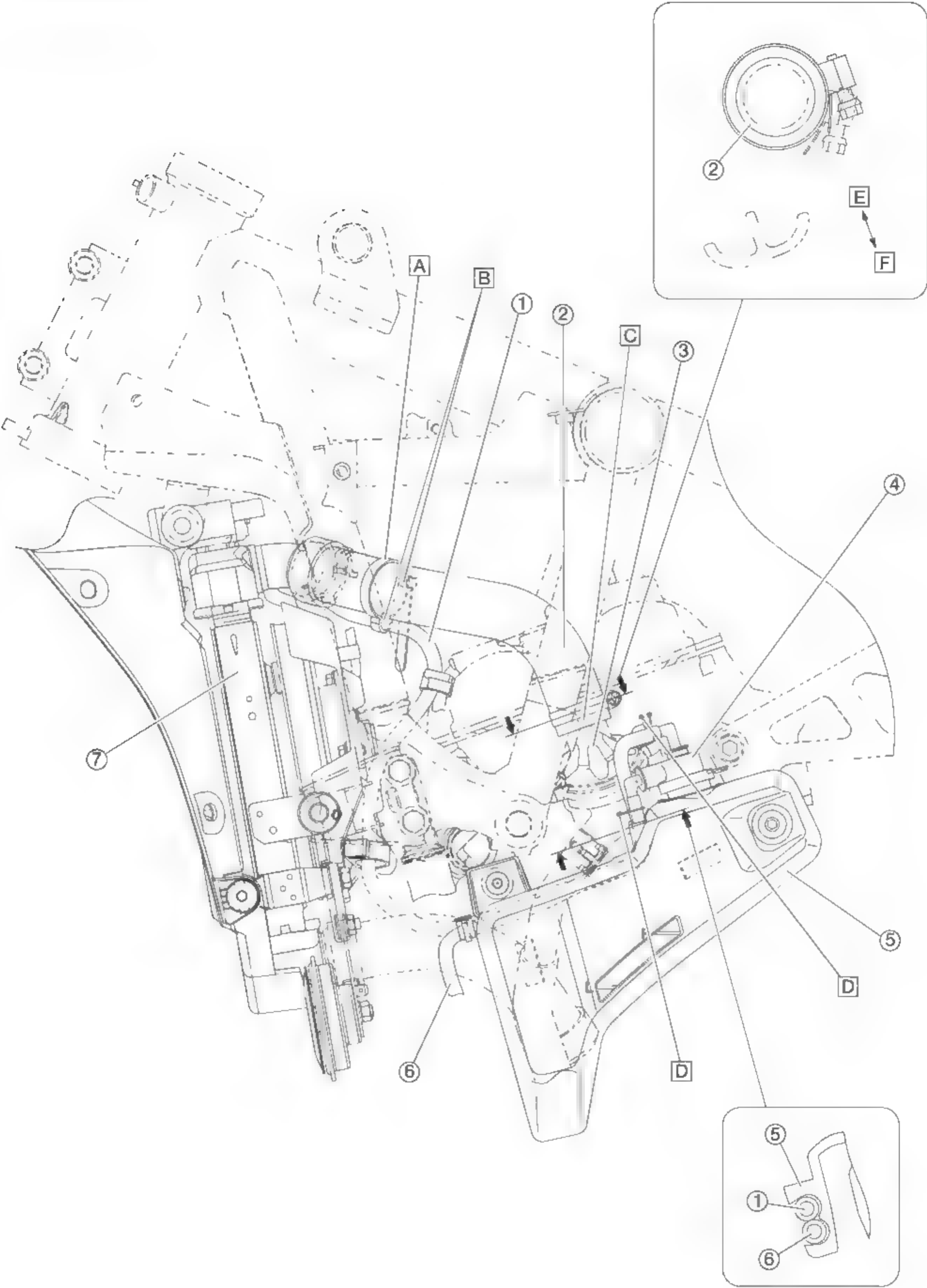
1. Brake hose (hydraulic unit to rear brake caliper)
2. Brake hose (rear brake master cylinder to hydraulic unit)
3. Brake hose (front brake master cylinder to hydraulic unit)
4. Brake hose (hydraulic unit to right front brake caliper)

Radiator (front and right side view)



1. Radiator inlet hose
2. Radiator
3. Radiator outlet hose
4. Radiator cap
5. Coolant reservoir hose
- A. Point the ends of the hose clamp inward. Install the hose clamp so that the ends of the hose clamp do not contact the coolant reservoir hose. Position the hose clamp 3 mm (0.12 in) or more away from the end of the radiator inlet hose. Make sure not to install the hose clamp on the raised portion of the hose fitting
- B. Align the yellow paint mark on the radiator inlet hose with the projection on the radiator pipe. Install the radiator inlet hose onto the radiator pipe so that the hose contacts the projection on the pipe.
- C. Point the ends of the hose clamp rearward. Position the hose clamp 3 mm (0.12 in) or more away from the end of the coolant reservoir hose. Make sure not to install the hose clamp on the raised portion of the hose fitting.

Radiator (left side view)



1. Coolant reservoir hose
2. Radiator inlet hose
3. Thermostat housing
4. Coolant reservoir cap
5. Coolant reservoir cover
6. Coolant reservoir breather hose
7. Radiator
- A. Fasten the coolant reservoir hose to the radiator inlet hose with the plastic locking tie. Position the coolant reservoir hose directly under the radiator inlet hose. Face the buckle of the plastic locking tie inward with the end pointing downward.
- B. Fasten the radiator inlet hose and coolant reservoir hose at the white paint mark on radiator inlet hose with the holder.
- C. Align the white paint mark on the radiator inlet hose with the projection on the thermostat housing. Install the radiator inlet hose onto the thermostat housing so that the hose contacts the projection on the housing.
- D. Point the ends of the hose clamp in the direction shown in the illustration. Position the hose clamp 3 mm (0.12 in) or more away from the end of the hose. Make sure not to install the hose clamp on the raised portion of the hose fitting.
- E. Inward
- F. Outward

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EAS20022

PERIODIC MAINTENANCE

EAS30022

INTRODUCTION

This chapter includes all information necessary to perform recommended checks and adjustments. If followed, these preventive maintenance procedures will ensure more reliable vehicle operation, a longer service life and reduce the need for costly overhaul work. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EAS30014

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

TIP

- From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.
- Items marked with an asterisk require special tools, data and technical skills, have a Yamaha dealer perform the service.

No.		ITEM	ROUTINE	INITIAL	ODOMETER READING					
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
1	*	Fuel line	<ul style="list-style-type: none">• Check fuel hoses for cracks or damage.• Replace if necessary.		✓	✓	✓	✓	✓	
2	*	Spark plugs	<ul style="list-style-type: none">• Check condition.• Adjust gap and clean.		✓		✓		✓	
			<ul style="list-style-type: none">• Replace.			✓		✓		
3	*	Valve clearance	<ul style="list-style-type: none">• Check and adjust valve clearance when engine is cold.	Every 26600 mi (42000 km)						
4	*	Crankcase breather system	<ul style="list-style-type: none">• Check breather hose for cracks or damage.• Replace if necessary.		✓	✓	✓	✓	✓	
5	*	Fuel Injection	<ul style="list-style-type: none">• Adjust synchronization.	✓	✓	✓	✓	✓	✓	
6	*	Exhaust system	<ul style="list-style-type: none">• Check for leakage.• Tighten if necessary.• Replace gaskets if necessary.	✓	✓	✓	✓	✓	✓	
7	*	Evaporative emission control system	<ul style="list-style-type: none">• Check control system for damage.• Replace if necessary.				✓		✓	

EAS30015

GENERAL MAINTENANCE AND LUBRICATION CHART

TIP

- From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.
- Items marked with an asterisk require special tools, data and technical skills, have a Yamaha dealer perform the service.

No.		ITEM	ROUTINE	INITIAL	ODOMETER READING					
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
1	*	Diagnostic system check	<ul style="list-style-type: none">• Perform dynamic inspection using Yamaha diagnostic tool.• Check the DTC.	✓	✓	✓	✓	✓	✓	

PERIODIC MAINTENANCE

No.	ITEM	ROUTINE	INITIAL	ODOMETER READING					
			600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
2	Air filter element	• Replace.	Every 12000 mi (19000 km)						
3	Air filter case check hose	• Clean.	✓	✓	✓	✓	✓	✓	
4	* Clutch	• Check operation. • Adjust or replace cable.	✓	✓	✓	✓	✓	✓	
5	* Front brake	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if neces- sary.	✓	✓	✓	✓	✓	✓	
6	* Rear brake	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if neces- sary.	✓	✓	✓	✓	✓	✓	
7	* Brake hoses	• Check for cracks or damage. • Check for correct routing and clamping.		✓	✓	✓	✓	✓	
		• Replace.	Every 4 years						
8	* Brake fluid	• Change.	Every 2 years						
9	* Wheels	• Check runout, spoke tight- ness and for damage. • Tighten spokes if necessary.	✓	✓	✓	✓	✓	✓	
10	* Tires	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		✓	✓	✓	✓	✓	
11	* Wheel bearings	• Check bearings for smooth operation. • Replace if necessary.		✓	✓	✓	✓	✓	
12	* Swingarm pivot bearings	• Check operation and for ex- cessive play.		✓	✓	✓	✓	✓	
		• Moderately repack with lithi- um-soap-based grease.	Every 32000 mi (50000 km)						
13	Drive chain	• Check chain slack, alignment and condition. • Adjust and lubricate chain with a special O-ring chain lu- bricant thoroughly.	Every 600 mi (1000 km) and after washing the motorcycle, riding in the rain or riding in wet areas						
14	* Steering bearings	• Check bearing assemblies for looseness.	✓	✓	✓	✓	✓	✓	
		• Moderately repack with lithi- um-soap-based grease.	Every 12000 mi (19000 km)						
15	* Chassis fasteners	• Check all chassis fitting and fasteners. • Correct if necessary.		✓	✓	✓	✓	✓	
16	Brake lever pivot shaft	• Apply silicone grease lightly.		✓	✓	✓	✓	✓	
17	Brake pedal pivot shaft	• Apply lithium-soap-based grease lightly.		✓	✓	✓	✓	✓	
18	Clutch lever pivot shaft	• Apply lithium-soap-based grease lightly.		✓	✓	✓	✓	✓	
19	Shift pedal pivot shaft	• Apply lithium-soap-based grease lightly.		✓	✓	✓	✓	✓	
20	Sidestand pivot	• Check operation. • Apply molybdenum disulfide grease lightly.		✓	✓	✓	✓	✓	
21	* Sidestand switch	• Check operation and replace if necessary.	✓	✓	✓	✓	✓	✓	
22	* Front fork	• Check operation and for oil leakage. • Replace if necessary.		✓	✓	✓	✓	✓	

PERIODIC MAINTENANCE

No.	ITEM	ROUTINE	INITIAL	ODOMETER READING					
			600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
23	* Shock absorber assembly	<ul style="list-style-type: none">• Check operation and for oil leakage.• Replace if necessary.		✓	✓	✓	✓	✓	
24	* Rear suspension link pivots	<ul style="list-style-type: none">• Apply lithium-soap-based grease lightly.	Every 12000 mi (19000 km)						
25	Engine oil	<ul style="list-style-type: none">• Change (warm engine before draining).	✓	✓	✓	✓	✓	✓	
26	Engine oil filter cartridge	<ul style="list-style-type: none">• Replace.	✓		✓		✓		
27	* Cooling system	<ul style="list-style-type: none">• Check coolant level and vehicle for coolant leakage.		✓	✓	✓	✓	✓	
		<ul style="list-style-type: none">• Change coolant.	Every 3 years						
28	* Front and rear brake switches	<ul style="list-style-type: none">• Check operation.	✓	✓	✓	✓	✓	✓	
29	* Control cables	<ul style="list-style-type: none">• Apply Yamaha cable lubricant or other suitable cable lubricant thoroughly.	✓	✓	✓	✓	✓	✓	
30	* Throttle grip	<ul style="list-style-type: none">• Check operation.• Check throttle grip free play, and adjust if necessary.• Lubricate cable and grip housing.		✓	✓	✓	✓	✓	
31	* Lights, signals and switches	<ul style="list-style-type: none">• Check operation.• Adjust headlight beam.	✓	✓	✓	✓	✓	✓	

TIP

- Air filter
 - This model uses a disposable oil-coated paper element. This element cannot be cleaned with compressed air, doing so will only damage it.
 - Replace the air filter more frequently if you often ride in the rain or dusty conditions.
- Hydraulic brake service
 - Regularly check the brake fluid levels. Replenish as necessary.
 - Every two years replace the internal components of the brake master cylinders and calipers, and change the brake fluid.
 - Replace the brake hoses every four years or sooner if cracked or damaged.

EAS32024

CHECKING THE VEHICLE USING THE YAMAHA DIAGNOSTIC TOOL

Use the Yamaha diagnostic tool and check the vehicle according to the following procedure.

1. Remove:

- Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

2. Disconnect the coupler from the CCU, and then connect the YDT to the coupler.



Yamaha diagnostic tool USB (US)
90890-03269

Yamaha diagnostic tool (A/I)
90890-03273

TIP

- Yamaha diagnostic tool (A/I) (90890-03273) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to "YDT" on page 9-2.

3. Check:

- DTC (Diagnostic Trouble Code)

TIP

Use the "Diagnosis of malfunction" function of the Yamaha diagnostic tool to check the DTC. For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.

DTC number is displayed → Check and repair the probable cause of the malfunction. Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-22.

4. Perform:

- Dynamic inspection

TIP

Use the "Dynamic inspection" function of the Yamaha diagnostic tool version 3.0 and after to perform the dynamic inspection. For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.

5. Install:

- Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30619

CHECKING THE FUEL LINE

1. Remove:

- Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Air scoops
- Air ducts
- Fuel tank side covers
Refer to "GENERAL CHASSIS (3)" on page 4-5.

2. Remove:

- Rear fuel tank mounting bracket bolts "1"
- Quick fasteners "2"

TIP

After removing the rear fuel tank mounting bracket bolts and quick fasteners, lift up the rear of the fuel tank.

ECA23380

NOTICE

When lifting up the fuel tank, be careful not to pull the fuel tank breather/overflow hose.



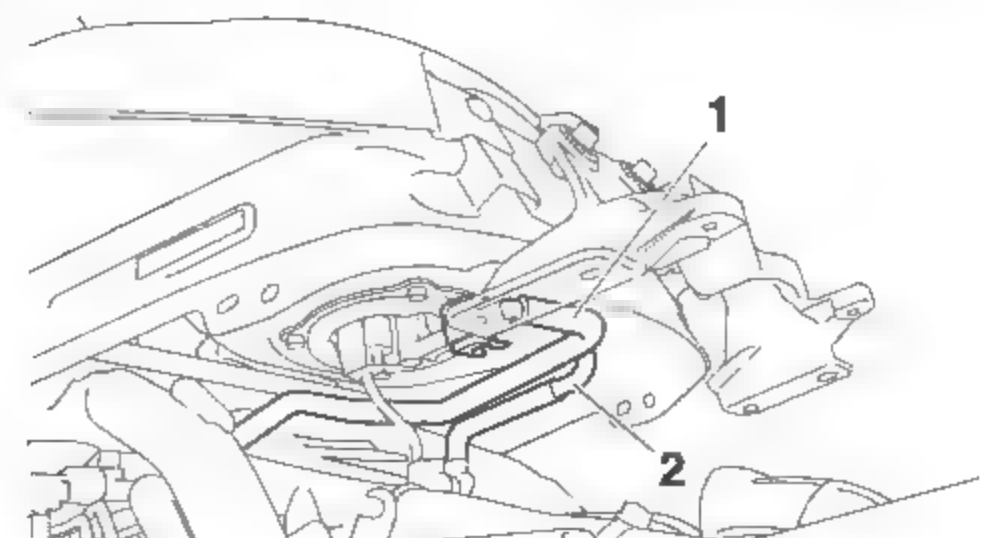
3. Check:

- Fuel hose "1"
- Fuel tank breather/overflow hose "2"
Cracks/damage → Replace.
Loose connection → Connect properly.

ECA16950

NOTICE

Make sure the fuel tank breather/overflow hose is routed correctly.



4. Install:

- Rear fuel tank mounting bracket bolts
- Quick fasteners



Rear fuel tank bracket bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)

5. Install:

- Fuel tank side covers
- Air ducts
- Air scoops
- Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Rider seat
- Refer to "GENERAL CHASSIS (1)" on page 4-1.

EASS0820

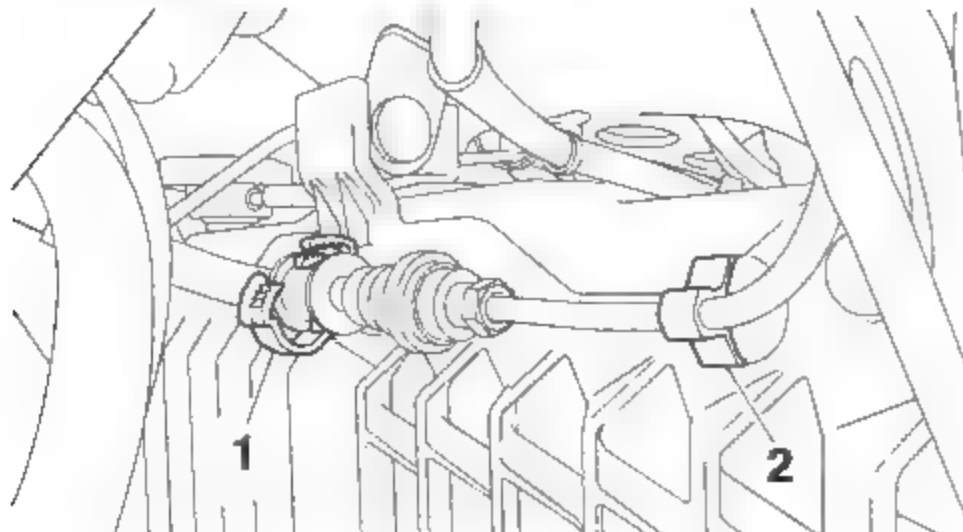
CHECKING THE SPARK PLUGS

1. Remove:

- Rider seat
- Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Air scoops
- Air ducts
- Fuel tank side covers
- Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Fuel tank
- Refer to "FUEL TANK" on page 7-1.
- Windshield (center/left)
- Refer to "GENERAL CHASSIS (4)" on page 4-8.
- Windshield inner panel (left)
- Refer to "GENERAL CHASSIS (5)" on page 4-10.
- Rectifier/regulator
- Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

2. Remove:

- Brake hose
- (from the holder "1")
- Holder "2"
- (from the radiator cover)

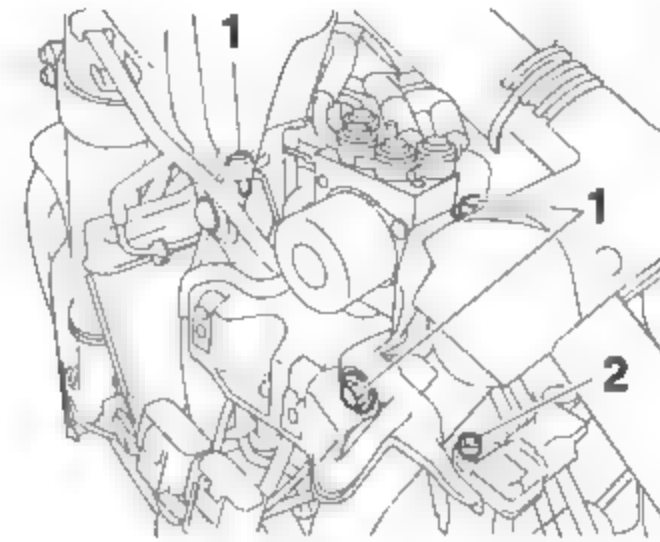


3. Remove:

- Hydraulic unit bracket bolts "1"
- Intake air pressure sensor bolt "2"

TIP

Remove the hydraulic unit assembly bracket bolts "1" and intake air pressure sensor bolt "2". Then, move the hydraulic unit assembly together with the bracket to the left.

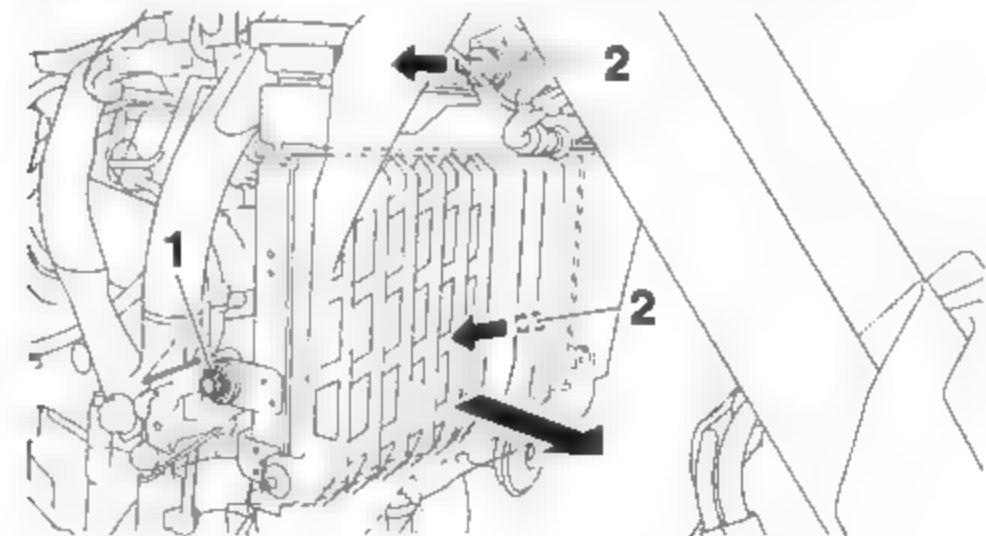


4. Remove:

- Radiator bolt "1"

TIP

Remove the radiator bolt "1", and then move the radiator to the right to remove it from the projections "2". Then, move the radiator forward.

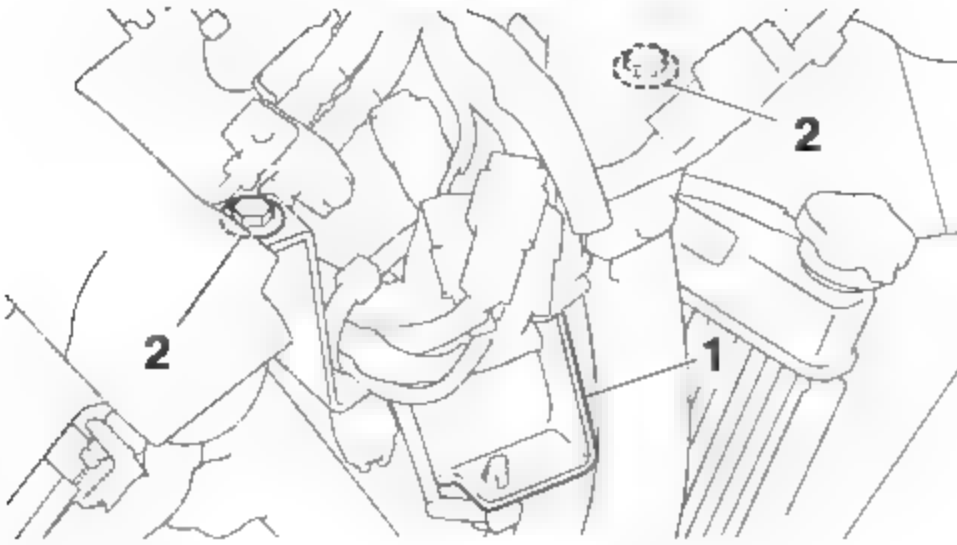


5. Remove:

- Coupler holder "1"

TIP

Disconnect all of the couplers installed to the coupler holder and the couplers above the coupler holder, and then remove the coupler holder bolts "2" and coupler holder.



6. Remove:
- Ignition coils
 - Spark plugs

ECA13320

NOTICE

Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

7. Check:
- Spark plug type
- Incorrect → Change.

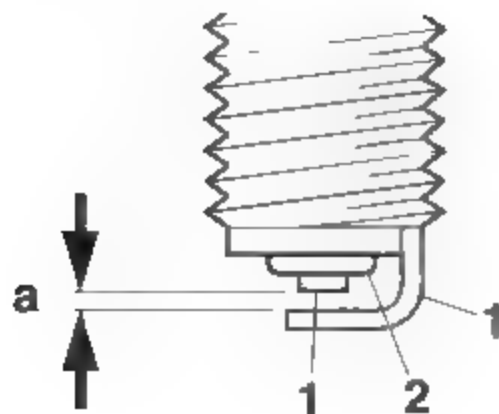


Manufacturer/model
NGK/LMAR8A-9

8. Check:
- Electrode "1"
- Damage/wear → Replace the spark plug.
- Insulator "2"
- Abnormal color → Replace the spark plug.
Normal color is medium-to-light tan.
9. Clean:
- Spark plug
- (with a spark plug cleaner or wire brush)
10. Measure:
- Spark plug gap "a"
- (with a wire thickness gauge)
Out of specification → Regap.



Spark plug gap
0.8–0.9 mm (0.031–0.035 in)



G088879

11. Install:
- Spark plugs
 - Ignition coils



Spark plug
13 N·m (1.3 kgf·m, 9.6 lb·ft)

TIP

Before installing the spark plug, clean the spark plug and gasket surface.

12. Install:
- Coupler holder



Coupler holder bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)

13. Install:
- Intake air pressure sensor bolt
 - Hydraulic unit bracket bolts



Hydraulic unit bracket bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)
Intake air pressure sensor bolt
3.8 N·m (0.38 kgf·m, 2.8 lb·ft)

14. Install:
- Radiator bolt
 - Holder
- (to the radiator cover)
- Brake hose
- (to the holder)



Radiator bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)

15. Install:
- Rectifier/regulator
- Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.
- Windshield inner panel (left)
- Refer to "GENERAL CHASSIS (5)" on page 4-10.
- Windshield (center/left)
- Refer to "GENERAL CHASSIS (4)" on page 4-8.
- Fuel tank
- Refer to "FUEL TANK" on page 7-1.
- Fuel tank side covers
 - Air ducts
 - Air scoops
- Refer to "GENERAL CHASSIS (3)" on page 4-5.

- Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30822

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

TIP

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

1. Drain:

- Coolant
Refer to "CHANGING THE COOLANT" on page 3-28.

2. Remove:

- Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Air scoops
- Air ducts
- Fuel tank side covers
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Fuel tank
Refer to "FUEL TANK" on page 7-1.
- Radiator
Refer to "RADIATOR" on page 6-2.
- Clutch cable guide
Refer to "ENGINE REMOVAL" on page 5-10.

3. Remove:

- Cylinder head cover
Refer to "CAMSHAFTS" on page 5-20.

4. Remove:

- Timing mark accessing bolt
- Crankshaft end cover
Refer to "GENERATOR AND STARTER CLUTCH" on page 5-43.

5. Measure:

- Valve clearance
Out of specification → Adjust.



Valve clearance (cold)

Intake

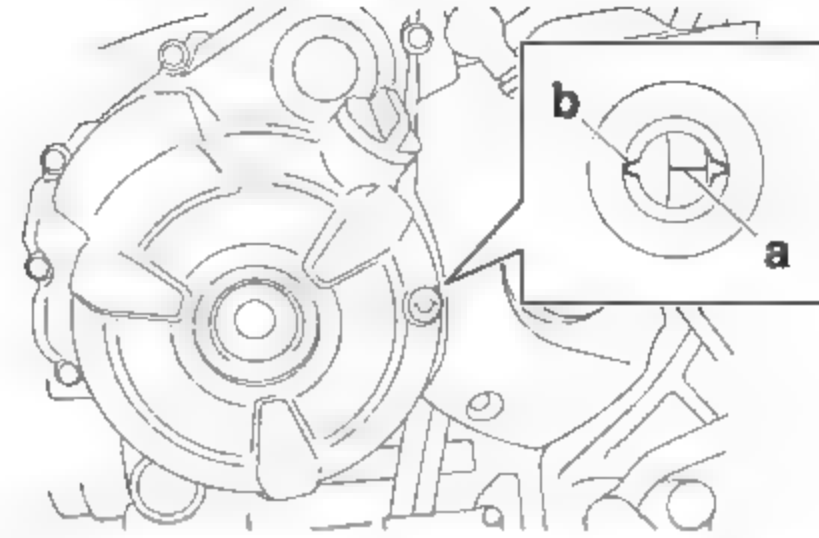
0.11–0.20 mm (0.0043–0.0079 in)

Exhaust

0.24–0.30 mm (0.0094–0.0118 in)

- Turn the crankshaft counterclockwise.

- When piston #1 is at TDC on the compression stroke, align the TDC mark "a" on the generator rotor with the slot "b" in the generator rotor cover.



- Measure the valve clearance with a thickness gauge.



Thickness gauge

90890-03268

Feeler gauge set

YU-26900-9

TIP

- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

Valve clearance measuring sequence

Cylinder #1 → #2



G088881

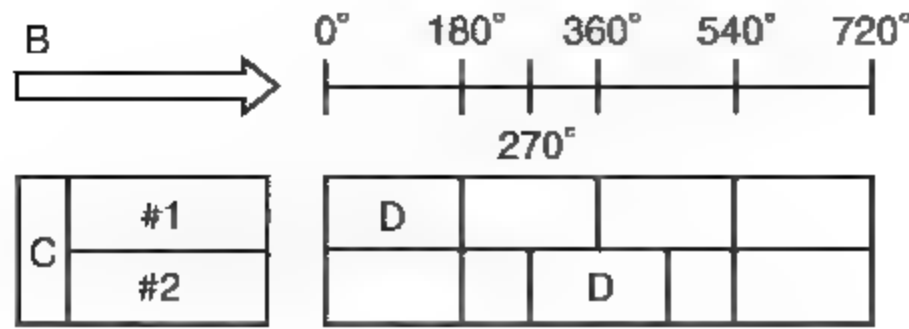
#1

#2

A. Front

- To measure the valve clearances of cylinder #2 turn the crankshaft 270° counterclockwise.

PERIODIC MAINTENANCE



6. Remove:
- Camshaft

TIP

- Refer to "CAMSHAFTS" on page 5-20.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

7. Adjust:

- Valve clearance
 - Remove the valve lifter and the valve pad with a valve lapper.



Valve lapper (ø14)
90890-04101

Valve lapper (ø14)
YM-A8998

TIP

- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve lifter and valve pad so that they can be installed in the correct place.

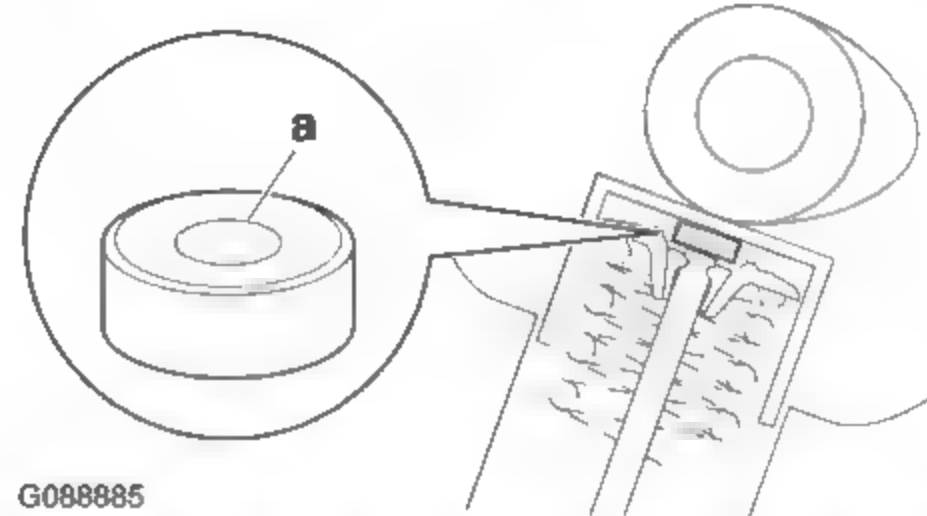
- Calculate the difference between the specified valve clearance and the measured valve clearance.
 Example:
 Specified valve clearance = 0.11–0.20 mm (0.0043–0.0079 in)
 Measured valve clearance = 0.25 mm (0.0098 in)
 0.25 mm (0.0098 in)–0.20 mm (0.0079 in) = 0.05 mm (0.0020 in)
- Check the thickness of the current valve pad.

TIP

The thickness "a" of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.

Example:

If the valve pad is marked "158", the pad thickness is 1.58 mm (0.0622 in).



- Calculate the sum of the values obtained in steps (b) and (c) to determine the required valve pad thickness and the valve pad number.

Example:

1.58 mm (0.0622 in) + 0.05 mm (0.0020 in) = 1.63 mm (0.0641 in)

The valve pad number is 163.

- Round off the valve pad number according to the following table, and then select the suitable valve pad.

Last digit	Rounded value
0, 1, 2	0
3, 4, 5, 6	5
7, 8, 9	10

TIP

Refer to the following table for the available valve pads.

Valve pad range	No. 150–240
Valve pad thickness	1.50–2.40 mm (0.0590–0.0944 in)
Available valve pads	19 thicknesses in 0.05 mm (0.0020 in) increments

Example:

Valve pad number = 163

Rounded value = 165

New valve pad number = 165

- Install the new valve pad and the valve lifter.

TIP

- Lubricate the valve pad with molybdenum disulfide oil.
- Lubricate the valve lifter with engine oil.
- Install the valve lifter and the valve pad in the correct place.
- The valve lifter must turn smoothly when rotated by hand.

g. Install the exhaust and intake camshafts, timing chain and camshaft caps.



Exhaust camshaft cap bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)
Intake camshaft cap bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)

TIP

- Refer to "CAMSHAFTS" on page 5-20.
- Lubricate the camshaft lobes and camshaft journals with molybdenum disulfide oil.
- First, install the exhaust camshaft.
- Align the camshafts sprocket marks with the cylinder head edge.
- Turn the crankshaft counterclockwise several full turns to seat the parts.

h. Measure the valve clearance again.
i. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

8. Install:
- All removed parts

TIP

For installation, reverse the removal procedure.

EAS31017

CHECKING THE ENGINE IDLING SPEED

TIP

Prior to checking the engine idling speed, the throttle body synchronization should be adjusted properly, the air filter element should be clean, and the engine should have adequate compression.

1. Start the engine and let it warm up for several minutes.
2. Check:
 - Engine idling speed
 Out of specification → Go to next step.



Engine idling speed
1250–1450 r/min

3. Check:

- ISC (idle speed control) learning value
"00" or "01" → Check the intake system.
"02" → Clean the ISC (idle speed control) valve.

Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-9.

- a. Connect the Yamaha diagnostic tool.
Use the diagnostic code number "67".
Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-22.



Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03273

TIP

- Yamaha diagnostic tool (A/I) (90890-03273) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to "YDT" on page 9-2.

- b. Check the ISC (idle speed control) leaning value.

EAS30797

SYNCHRONIZING THE THROTTLE BODIES

TIP

Before synchronizing the throttle bodies, check the following items:

- Valve clearance
- Spark plugs
- Air filter element
- Throttle body joints
- Fuel hose
- Exhaust system
- Cylinder head breather hose
- Vacuum hoses

Checking the throttle body synchronization

1. Stand the vehicle on a level surface.

TIP

Place the vehicle on a suitable stand.

PERIODIC MAINTENANCE

2. Remove:

- Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Air scoops
- Air ducts
- Fuel tank side cover
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Fuel tank
Refer to "FUEL TANK" on page 7-1.

3. Disconnect:

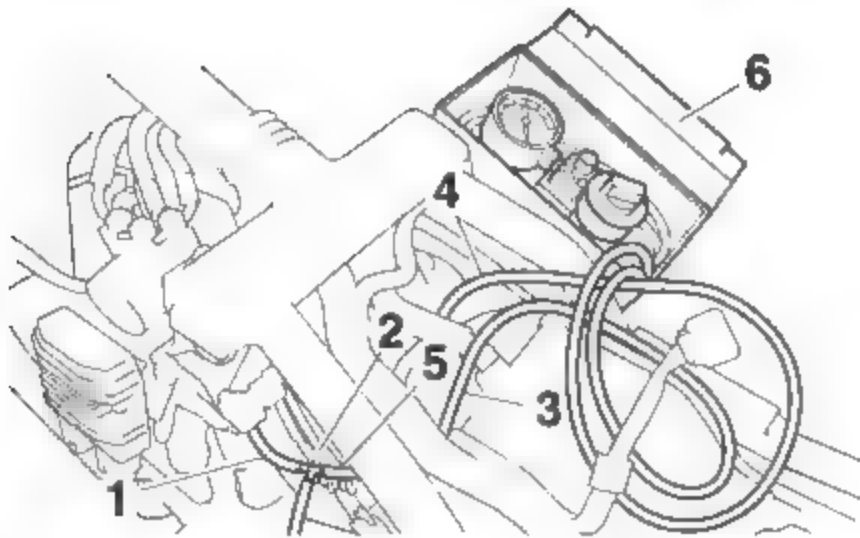
- Intake air pressure sensor hose
- Cap
Refer to "THROTTLE BODIES" on page 7-6.

4. Install:

- Hose "1" (Parts No.: 5JW-24311-00)
- 3-way joint "2" (Parts No.: 90413-05014)
- Vacuum gauge hose #1 "3" (to throttle body #1)
- Vacuum gauge hose #2 "4" (to throttle body #2)
- Intake air pressure sensor hose "5"
- Vacuum gauge "6"



Vacuum gauge
90890-03094
Vacuумmate
YU-44456



5. Install:

- Fuel tank
Refer to "FUEL TANK" on page 7-1.

6. Check:

- Throttle body synchronization
 - a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.



Engine idling speed
1250–1450 r/min

- b. Check the vacuum pressure.



**Difference in vacuum pressure
between the cylinders**
**0 kPa-1.3 kPa (0 mmHg-10
mmHg, 0 inHg-0.4 inHg)**

If out of specification → Adjust the throttle body synchronization.

Adjusting the throttle body synchronization

1. Adjust:

- Throttle body synchronization
 - a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.



Engine idling speed
1250–1450 r/min

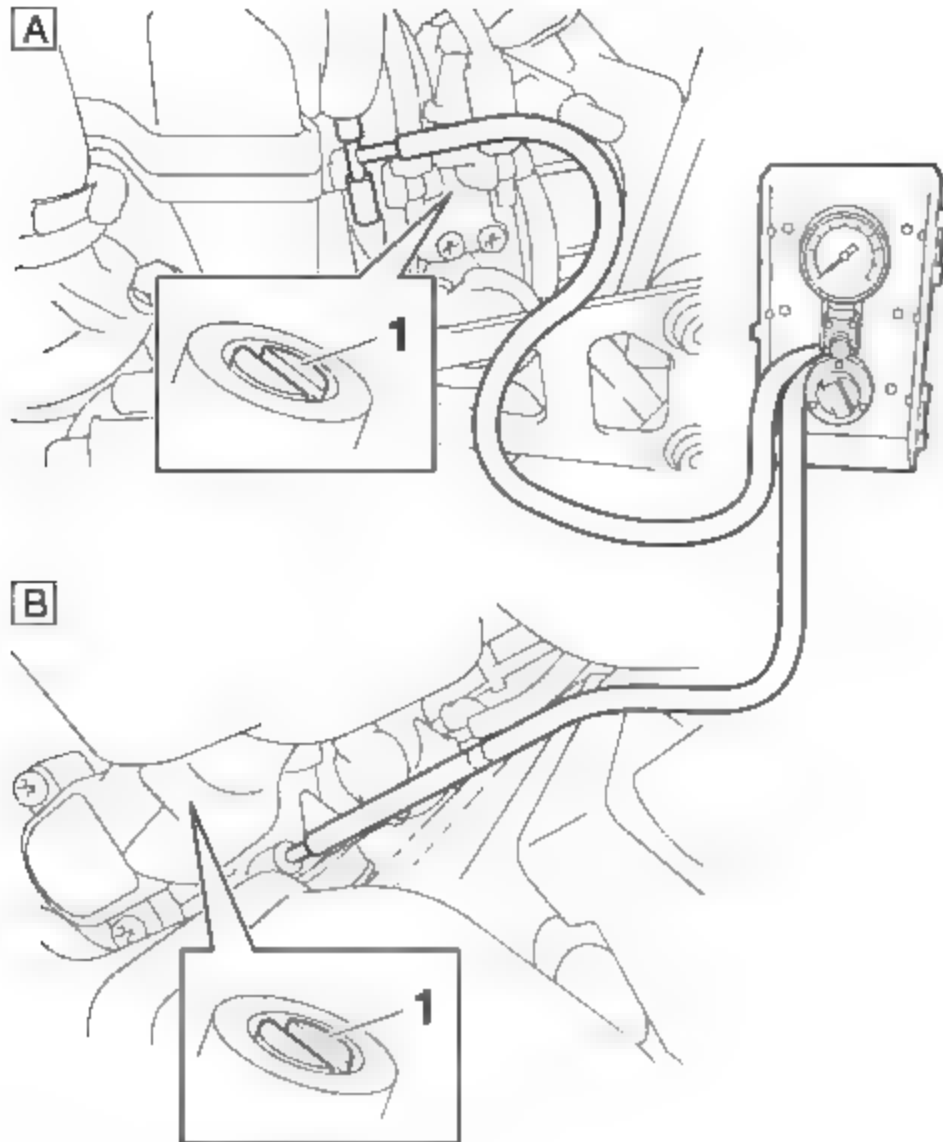
- b. With throttle body #1 as standard, adjust throttle body #2 using the air screw "1".

TIP

- Turn the bypass air screw using the carburetor angle driver.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If a bypass air screw was removed, turn the screw in fully and be sure to synchronize the throttle bodies.
- If the throttle body synchronization can not be adjusted using the bypass air screw, clean or replace the throttle bodies.
- The difference in vacuum pressure between the throttle bodies should not exceed 1.3 kPa (10 mmHg).



Carburetor angle driver 2
90890-03173



A. Throttle body #1

B. Throttle body #2

2. Stop the engine and remove the measuring equipment.
3. Connect:
 - Intake air pressure sensor hose
 - Cap
 Refer to "THROTTLE BODIES" on page 7-6.
4. Install:
 - Fuel tank
 - Refer to "FUEL TANK" on page 7-1.
 - Fuel tank side cover
 - Air ducts
 - Air scoops
 - Refer to "GENERAL CHASSIS (3)" on page 4-5.
 - Rider seat
 - Refer to "GENERAL CHASSIS (1)" on page 4-1.
5. Adjust:
 - Throttle grip free play
 - Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-30.



Throttle grip free play
3.0–5.0 mm (0.12–0.20 in)

EAS30623

CHECKING THE CYLINDER HEAD BREATHER HOSE

1. Check:
 - Cylinder head breather hose
 - Cracks/damage → Replace.
 - Loosen connection → Connect properly.

EAS30622

CHECKING THE EXHAUST SYSTEM

1. Check:
 - Muffler assembly "1"
 - Exhaust pipe "2"
 - Cracks/damage → Replace.
 - Gaskets "3", "4"
 - Exhaust gas leaks → Replace.
2. Check:
 - Tightening torque
 - Exhaust pipe nuts "5"
 - Muffler bolt "6"
 - Exhaust pipe joint bolt "7"
 - Exhaust pipe bracket bolts "8"
 - Exhaust pipe bracket bolt "9"



Exhaust pipe nut "5"

20 N·m (2.0 kgf·m, 15 lb·ft)

Muffler bolt "6"

47 N·m (4.7 kgf·m, 35 lb·ft)

Exhaust pipe joint bolt "7"

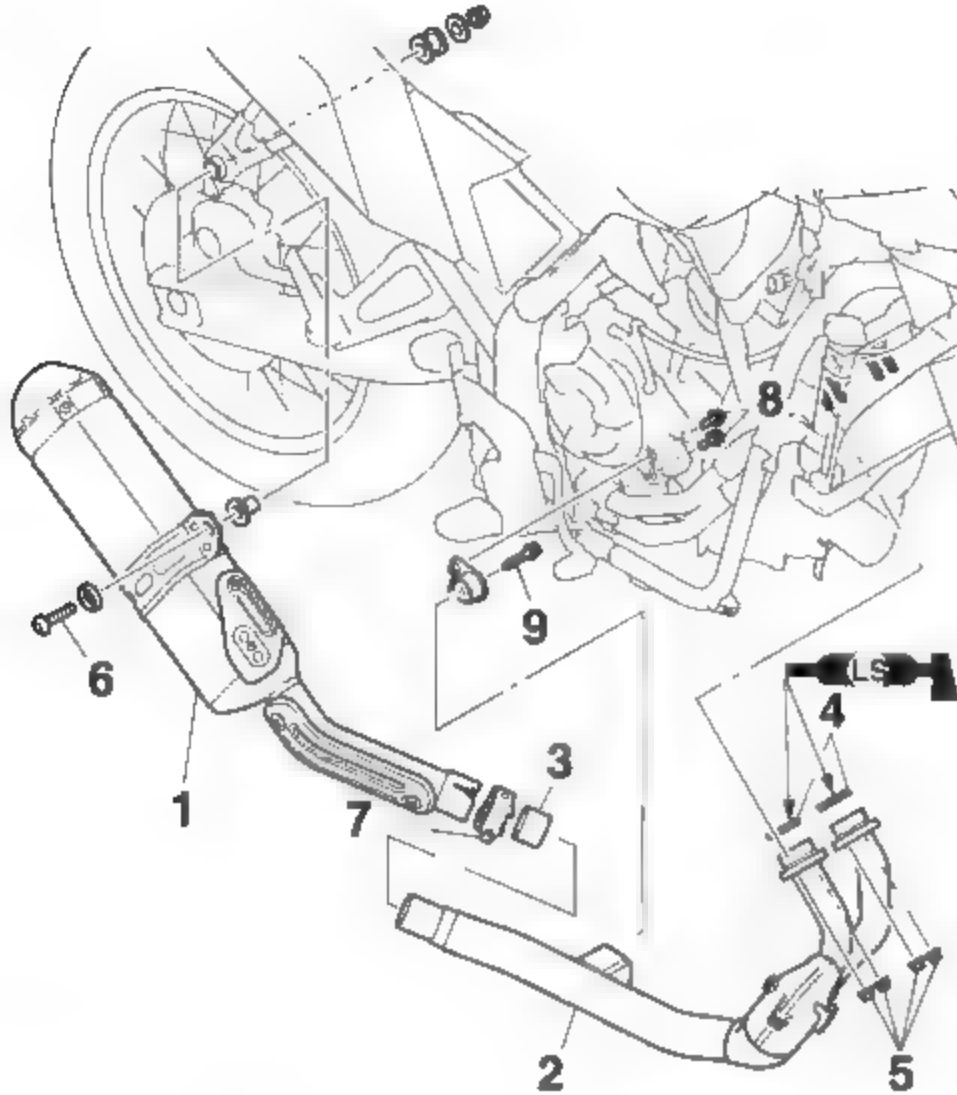
20 N·m (2.0 kgf·m, 15 lb·ft)

Exhaust pipe bracket bolt "8"

10 N·m (1.0 kgf·m, 7.4 lb·ft)

Exhaust pipe bracket bolt "9"

20 N·m (2.0 kgf·m, 15 lb·ft)



EAS30826

CHECKING THE CANISTER

1. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
 - Air scoops
 - Air ducts
 - Fuel tank side covers
Refer to "GENERAL CHASSIS (3)" on page 4-5.
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.
2. Check:
 - Canister
 - Canister purge hose
 - Fuel tank breather/overflow hoses
 - Canister breather hose
Cracks/damage → Replace.
3. Install:
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.
 - Fuel tank side covers
 - Air ducts
 - Air scoops
Refer to "GENERAL CHASSIS (3)" on page 4-5.
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS33546

CHECKING THE PURGE CUT VALVE SOLENOID

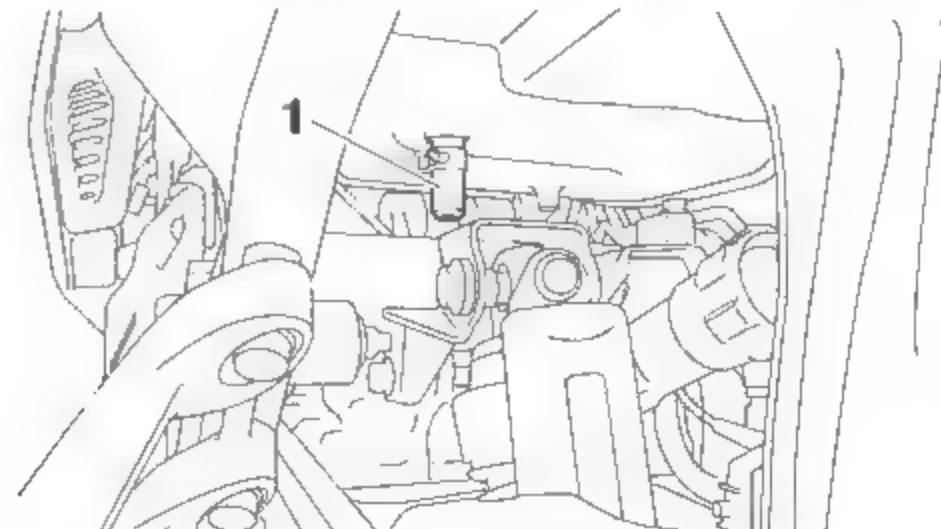
1. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
 - Air scoops
 - Air ducts
 - Fuel tank side covers
Refer to "GENERAL CHASSIS (3)" on page 4-5.
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.
2. Check:
 - Canister purge hose
 - Purge cut valve solenoid
Cracks/damage → Replace.
3. Check:
 - Purge cut valve solenoid resistance
Refer to "CHECKING THE PURGE CUT VALVE SOLENOID" on page 8-48.
4. Install:
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.
 - Fuel tank side covers
 - Air ducts
 - Air scoops
Refer to "GENERAL CHASSIS (3)" on page 4-5.
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS31130

REPLACING THE AIR FILTER ELEMENT AND CLEANING THE CHECK HOSE

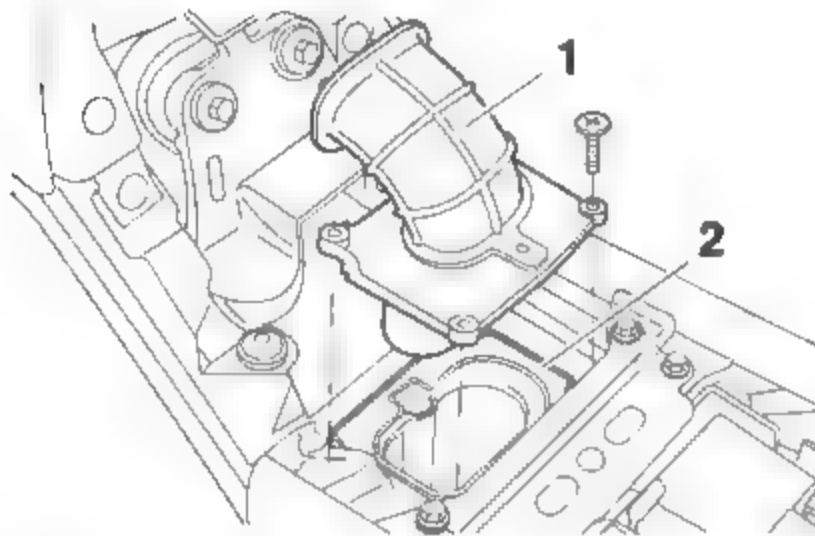
TIP

There is an air filter check hose "1" at the bottom of the air filter case. If dust and/or water collects in this hose, clean the air filter check hose and replace the air filter element.



1. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
 - Air scoops
 - Air ducts
 - Fuel tank side covers
Refer to "GENERAL CHASSIS (3)" on page 4-5.
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.

2. Remove:
 - Air filter case cover "1"
 - Air filter element "2"



3. Check:
 - Air filter element
Damage → Replace.

TIP

- Replace the air filter element every 20000 km (12000 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

4. Install:
 - Air filter element
 - Air duct cover



Air filter element screw
1.6 N·m (0.16 kgf-m, 1.2 lb-ft)
Air duct cover screw
1.6 N·m (0.16 kgf-m, 1.2 lb-ft)

ECA14401

NOTICE

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect carburetor synchronization, leading to poor engine performance and possible overheating.

5. Install:
 - Fuel tank
Refer to "FUEL TANK" on page 7-1.

- Fuel tank side covers
- Air ducts
- Air scoops
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

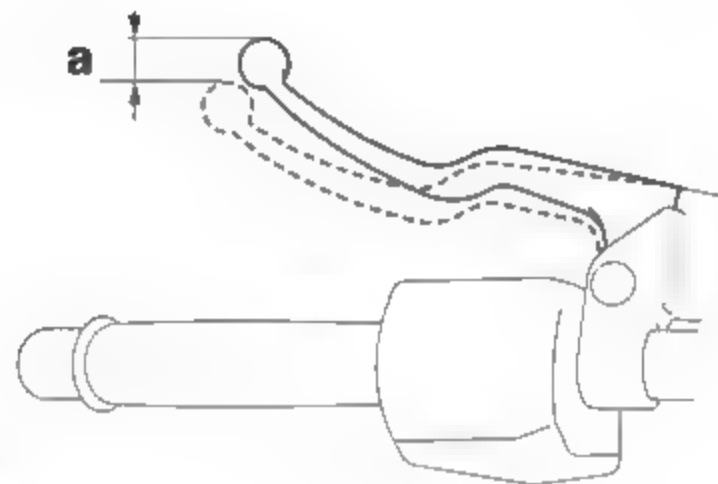
EAS30628

ADJUSTING THE CLUTCH LEVER FREE PLAY

1. Check:
 - Clutch lever free play "a"
Out of specification → Adjust.



Clutch lever free play
5.0–10.0 mm (0.20–0.39 in)

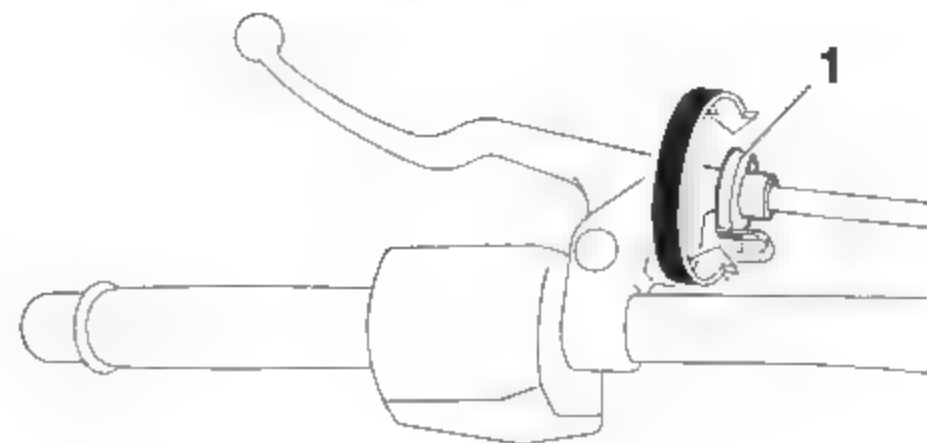


G088887

2. Adjust:
 - Clutch lever free play

Handlebar side

- a. Turn the adjusting bolt "1" until the specified clutch lever free play is obtained.



G088888

TIP

If the specified clutch lever free play cannot be obtained on the handlebar side of the cable, use the adjusting nut on the engine side.

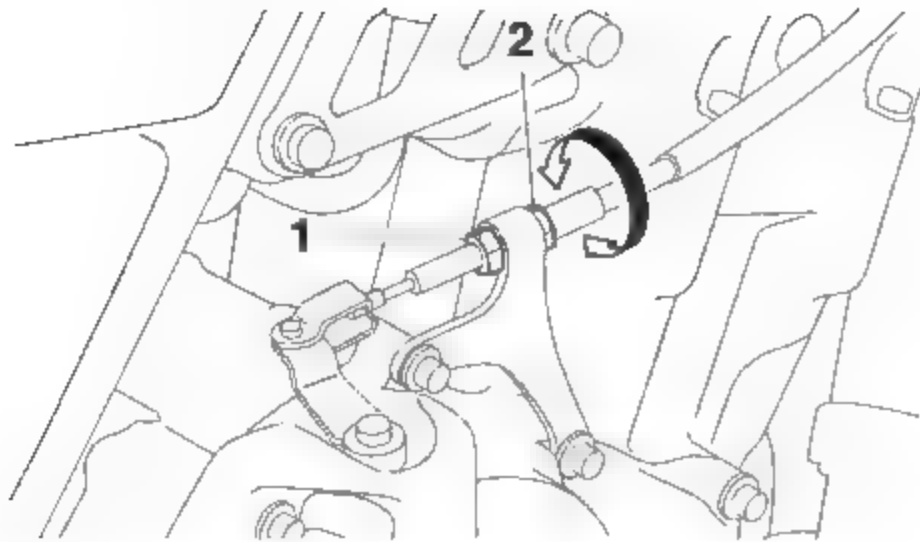
Engine side

- a. Loosen the locknut "1".
- b. Turn the adjusting nut "2" until the specified clutch lever free play is obtained.

c. Tighten the locknut "1".



Clutch cable locknut
7 N·m (0.7 kgf·m, 5.2 lb·ft)



EAS30801

CHECKING THE BRAKE OPERATION

1. Check:

- Brake operation
Brake not working properly → Check the brake system.
Refer to "FRONT BRAKE" on page 4-26 and "REAR BRAKE" on page 4-37.

TIP

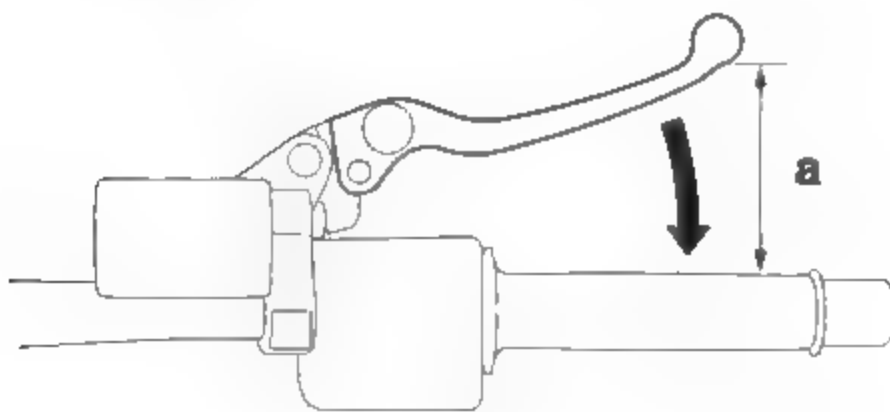
Drive on the dry road, operate the front and rear brakes separately and check to see if the brakes are operating properly.

EAS30830

ADJUSTING THE FRONT DISC BRAKE

1. Adjust:

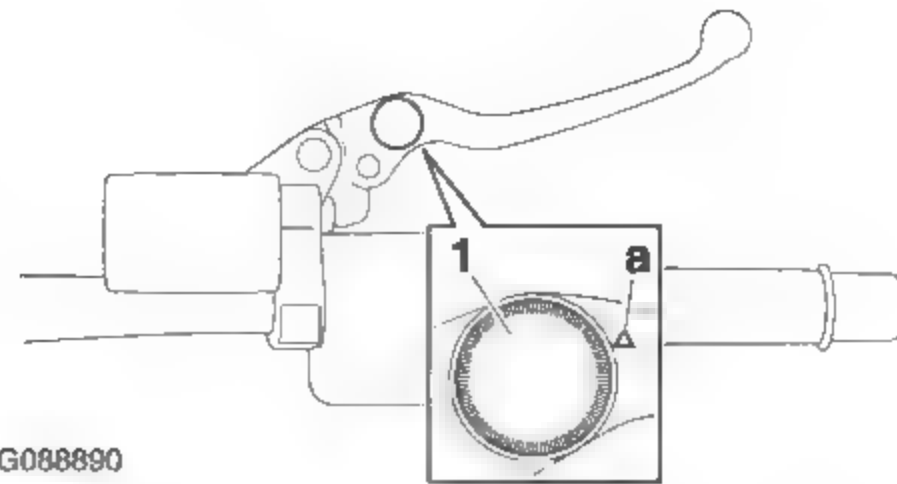
- Brake lever position
(distance "a" from the throttle grip to the brake lever)



G088889

TIP

- While pushing the brake lever forward, turn the adjusting dial "1" until the brake lever is in the desired position.
- Be sure to align the setting on the adjusting dial with the arrow mark "a" on the brake lever holder.



G088890

EWA13050

WARNING

A soft or spongy feeling in the brake lever can indicate the presence of air in the brake system. Before the vehicle is operated, the air must be removed by bleeding the brake system. Air in the brake system will considerably reduce braking performance.

ECA13490

NOTICE

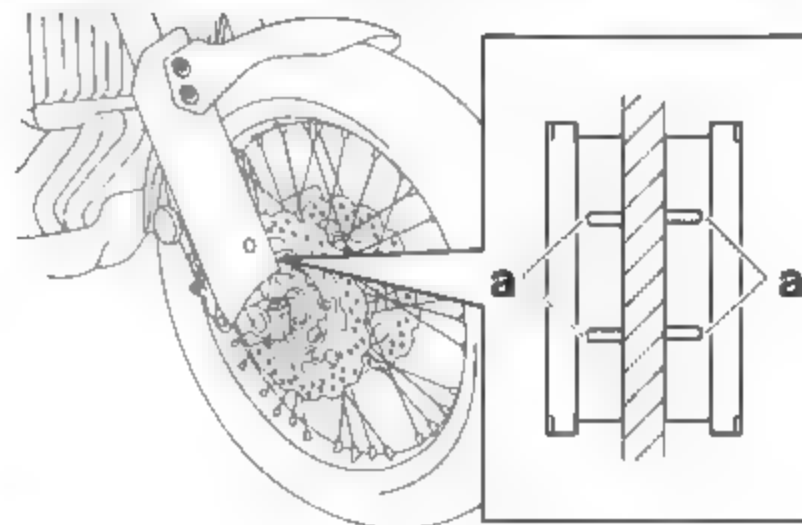
After adjusting the brake lever position, make sure there is no brake drag.

EAS30833

CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
 - Front brake pad
Wear indicator groove "a" has almost disappeared → Replace the brake pads as a set.
Refer to "FRONT BRAKE" on page 4-26.



EAS30831

ADJUSTING THE REAR DISC BRAKE

1. Adjust:

- Brake pedal position
 - a. Loosen the locknut "1".
 - b. Turn the adjusting bolt "2" until the specified brake pedal position is obtained.

EWA18830

WARNING

After adjusting the brake pedal position, check that the end of the adjusting bolt "a" is visible through the hole "b".

c. Tighten the locknut "1" to specification.



Rear brake pedal adjusting locknut
18 N·m (1.8 kgf·m, 13 lb·ft)

EWA17030

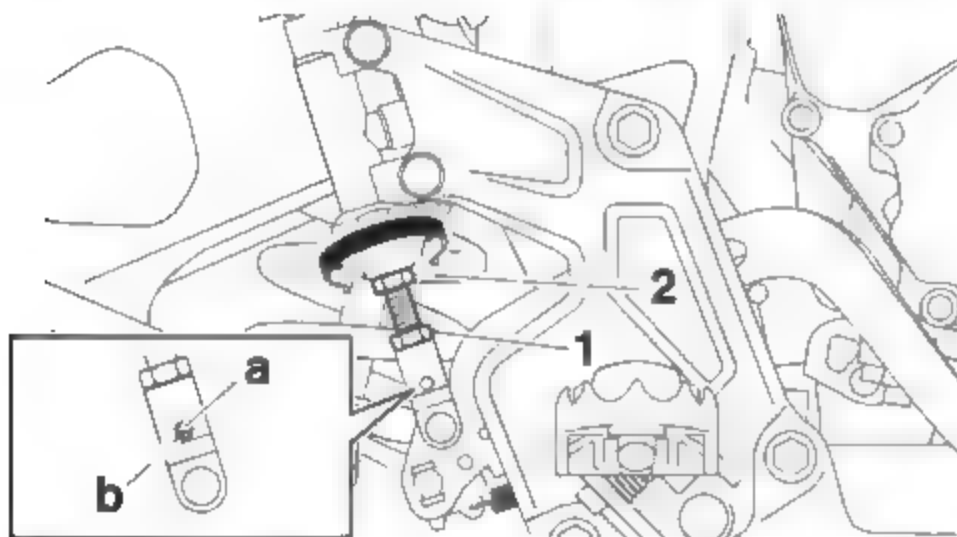
WARNING

A soft or spongy feeling in the brake pedal can indicate the presence of air in the brake system. Before the vehicle is operated, the air must be removed by bleeding the brake system. Air in the brake system will considerably reduce braking performance.

ECA13510

NOTICE

After adjusting the brake pedal position, make sure there is no brake drag.



2. Adjust:

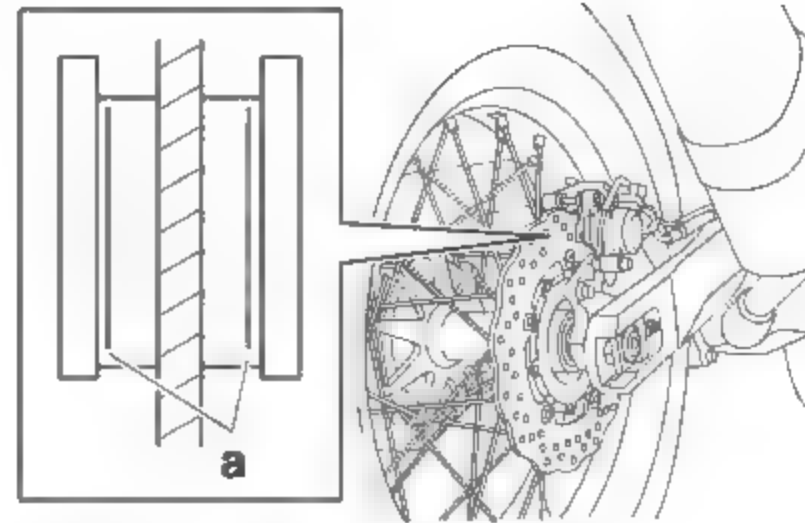
- Rear brake light switch
Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-30.

EAS30834

CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
 - Rear brake pad
Worn almost to the wear indicator "a" → Replace the brake pads as a set.
Refer to "REAR BRAKE" on page 4-37.



EAS30894

CHECKING THE BRAKE HOSES

The following procedure applies to all of the brake hoses and brake hose holders.

1. Check:
 - Brake hoses
Cracks/damage/wear → Replace.
2. Check:
 - Brake hose holders
Loose → Tighten the holder bolts.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
 - Brake hose
Brake fluid leakage → Replace the damaged hose.
Refer to "FRONT BRAKE" on page 4-26, "REAR BRAKE" on page 4-37 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

EAS30893

BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)

EWA14000

WARNING

Always bleed the brake system when the brake related parts are removed.

ECA18050

NOTICE

- Bleed the brake system in the following order.
- 1st step: Front brake calipers
- 2nd step: Rear brake caliper

EWA18530

WARNING

Bleed the ABS whenever:

- the system is disassembled.
- a brake hose is loosened, disconnected or replaced.
- the brake fluid level is very low.
- brake operation is faulty.

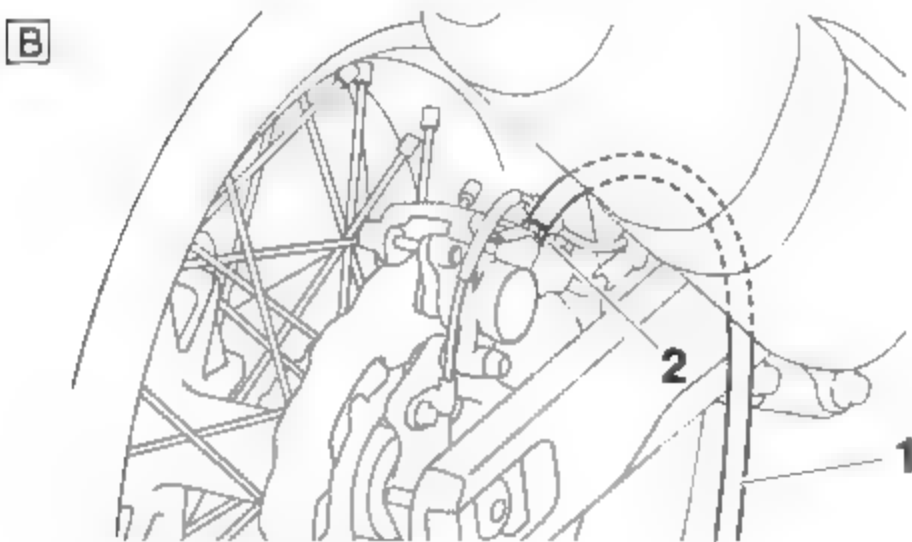
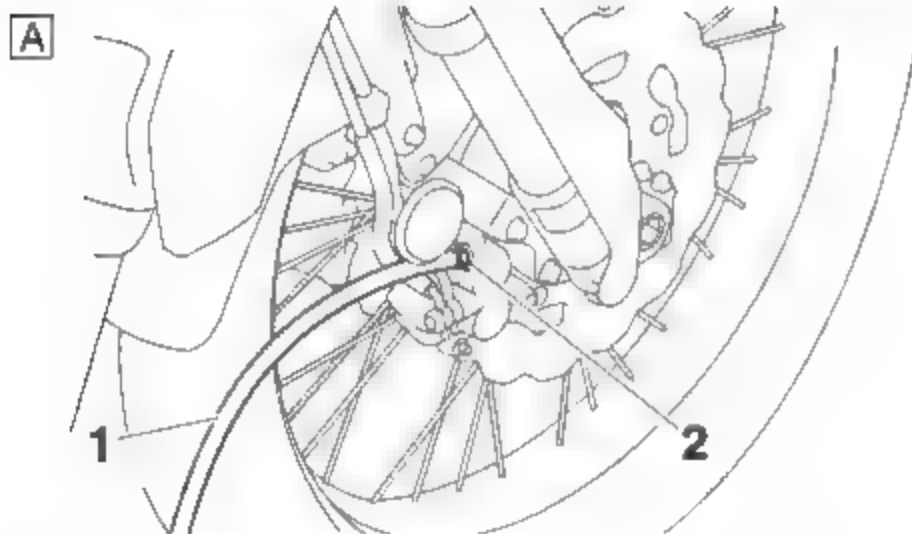
TIP

- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the ABS, make sure that there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the ABS, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours.
- Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.

1. Bleed:

• ABS

- Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the specified brake fluid.
- Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir).
- Connect a clear plastic hose "1" tightly to the bleed screw "2".



A. Front brake caliper

B. Rear brake caliper

- Place the other end of the hose into a container.
- Slowly apply the brake several times.
- Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.
- Loosen the bleed screw.

TIP

Loosening the bleed screw will release the pressure and cause the brake lever to contact the throttle grip or the brake pedal to fully extend.

- Tighten the bleed screw and then release the brake lever or brake pedal.
- Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- Check the operation of the hydraulic unit. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-53.

ECA18080

NOTICE

Make sure that the main switch is turned to "OFF" before checking the operation of the hydraulic unit.

- After operating the ABS, repeat steps (e) to (i), and then fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the specified brake fluid.
- Tighten the bleed screw to specification.



**Brake caliper bleed screw
10 N·m (1.0 kgf·m, 7.4 lb·ft)**

- Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the specified brake fluid. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-16.

EWA13110

WARNING

After bleeding the hydraulic brake system, check the brake operation.

EAS30632

CHECKING THE BRAKE FLUID LEVEL

- Stand the vehicle on a level surface.

TIP

- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.

2. Check:

- Brake fluid level
Below the minimum level mark → Add the specified brake fluid to the proper level.



**Specified brake fluid
DOT 4**

EWA13090

WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

TIP

In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

EAS30838

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

1. Check:
 - Wheel
 Damage/out-of-round → Replace.

EWA13280

WARNING

Never attempt to make any repairs to the wheel.

TIP

After a tire or wheel has been changed or replaced, always balance the wheel.

EAS30109

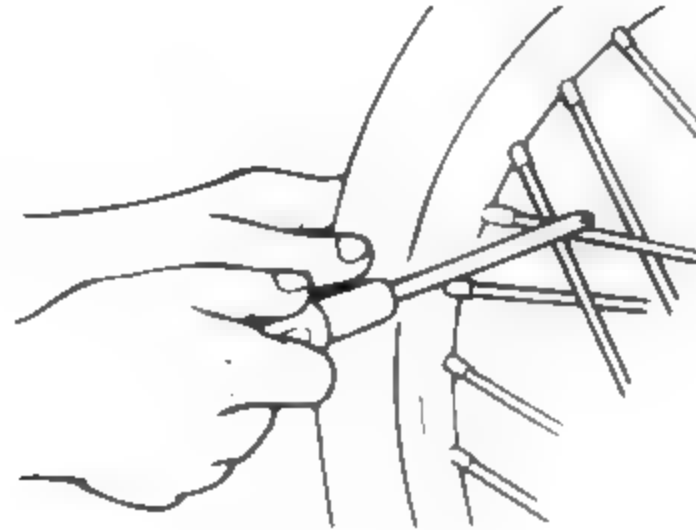
CHECKING AND TIGHTENING THE SPOKES

The following procedure applies to all of the spokes.

1. Check:
 - Spoke
 Bends/damage → Replace.
 Loose → Tighten.
 Tap the spokes with a screwdriver.

TIP

A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.



2. Tighten:
 - Spoke (with a spoke nipple wrench "1")

TIP

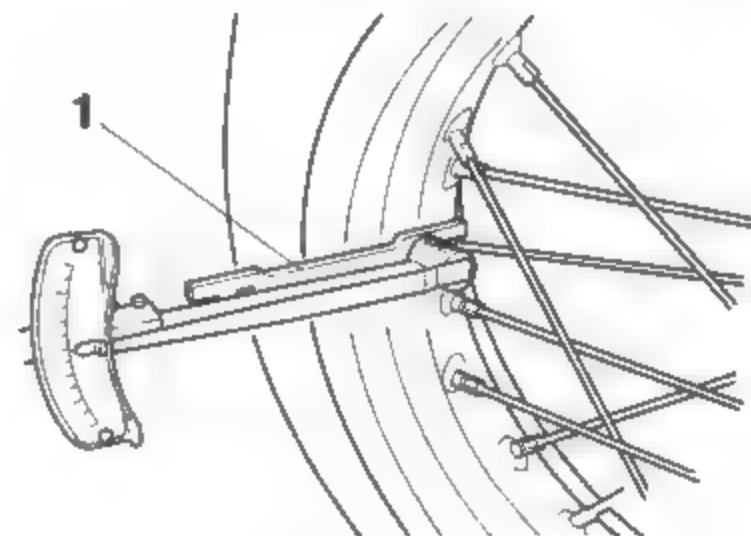
Be sure to tighten the spokes before and after break-in.



Spoke nipple wrench (6-7)
 90890-01521
Spoke nipple wrench (6-7)
 YM-01521



Spoke (front)
 4.3 N·m (0.43 kgf·m, 3.2 lb·ft)
Spoke (rear)
 4.3 N·m (0.43 kgf·m, 3.2 lb·ft)



EAS30840

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:
 - Tire pressure
 Out of specification → Regulate.

EWA13181

WARNING

- The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.

PERIODIC MAINTENANCE

- The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
- Operation of an overloaded vehicle could cause tire damage, an accident or an injury.
NEVER OVERLOAD THE VEHICLE.



Tire air pressure (measured on cold tires)

Front

220 kPa (2.20 kgf/cm², 32 psi)

Rear

250 kPa (2.50 kgf/cm², 36 psi)

Maximum load

189 kg (417 lb)

* Total weight of rider, passenger, cargo and accessories

2. Check:

- Tire surfaces

Damage/wear → Replace the tire.

EWA13190



It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.



Wear limit (front)

1.0 mm (0.04 in)

Wear limit (rear)

1.0 mm (0.04 in)

EWA14090



After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this vehicle.



Front tire

Size

90/90-21 M/C 54V M+S A

Manufacturer/model

PIRELLI/SCORPION RALLY STR



Rear tire

Size

150/70 R18 M/C 70V M+S

Manufacturer/model

PIRELLI/SCORPION RALLY STR

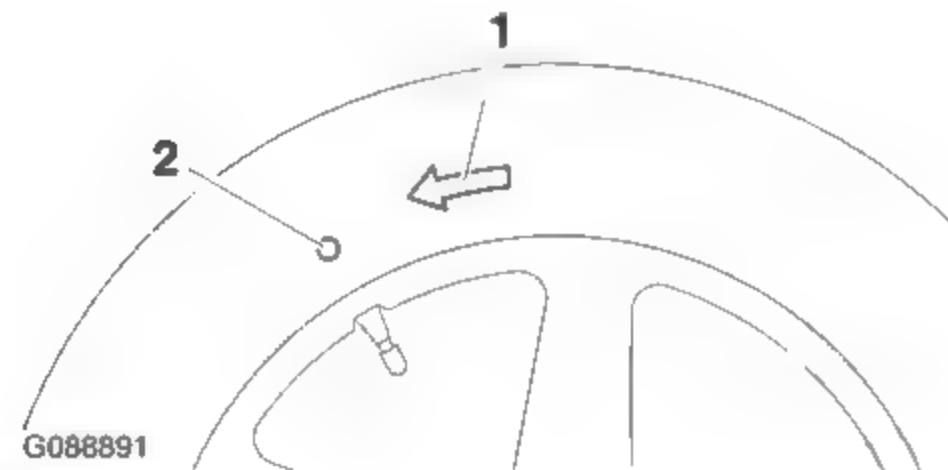
EWA13210



New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

TIP

- For tires with a direction of rotation mark "1": Install the tire with the mark pointing in the direction of wheel rotation.
- Align the mark "2" with the valve installation point.



EAS30641

CHECKING THE WHEEL BEARINGS

The following procedure applies to all of the wheel bearings.

1. Check:

- Wheel bearings

Refer to "CHECKING THE FRONT WHEEL" on page 4-13 and "CHECKING THE REAR WHEEL" on page 4-21.

EAS30802

CHECKING THE SWINGARM OPERATION

1. Check:

- Swingarm operation

Swingarm not working properly → Check the swingarm.

Refer to "SWINGARM" on page 4-82.

2. Check:

- Swingarm excessive play

Refer to "SWINGARM" on page 4-82.

EAS30843

LUBRICATING THE SWINGARM PIVOT

1. Lubricate:
 - Oil seals
 - Pivot shaft



Recommended lubricant
Lithium-soap-based grease

Refer to "INSTALLING THE SWINGARM" on page 4-85.

EAS30844

ADJUSTING THE DRIVE CHAIN SLACK

ECA13560

NOTICE

A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

EWA13120

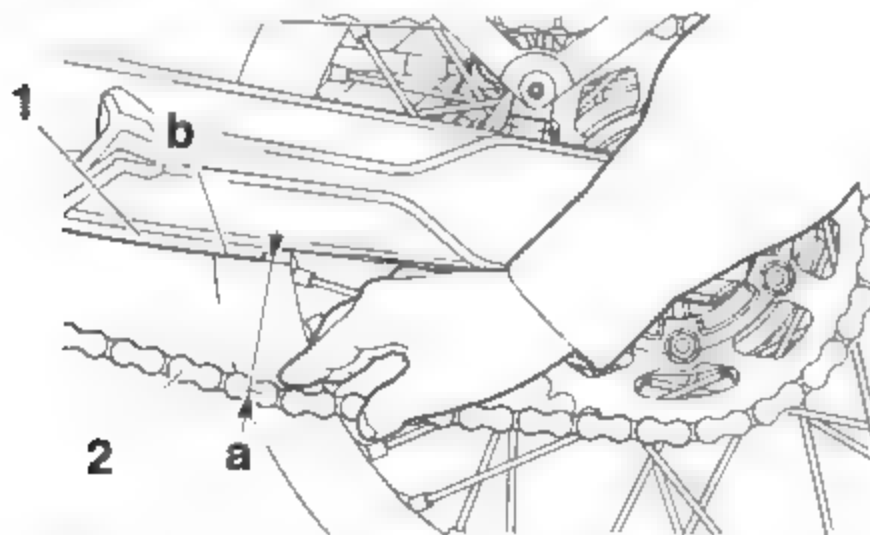
WARNING

Securely support the vehicle so that there is no danger of it falling over.

1. Shift the transmission into the neutral position.
2. Check:
 - Drive chain slack
 Out of specification → Adjust.

TIP

Measure the distance "a" between the rib end "b" on the drive chain guide "1" and the center of the drive chain "2".



Drive chain slack (Sidestand)
43.0–48.0 mm (1.69–1.89 in)
Drive chain slack (Maintenance stand)
43.0–48.0 mm (1.69–1.89 in)
Drive chain slack limit
55.0 mm (2.17 in)

ECA20870

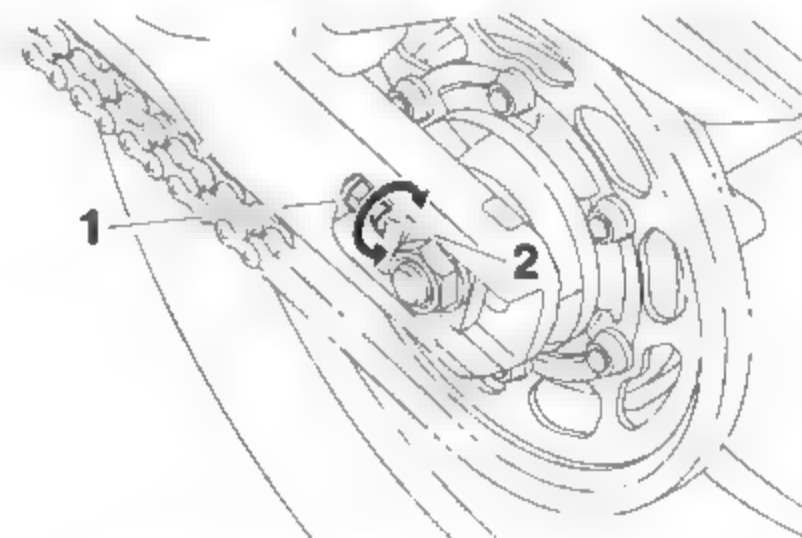
NOTICE

Improper drive chain slack will overload the engine as well as other vital parts of the motorcycle and can lead to chain slippage or breakage. If the drive chain slack is more than the specified limit, the chain can damage the frame, swingarm, and other parts. To prevent this from occurring, keep the drive chain slack within the specified limits.

3. Loosen:
 - Wheel axle nut
 Refer to "REAR WHEEL" on page 4-18.
4. Adjust:
 - Drive chain slack
 - a. Loosen both of the drive chain puller locknuts "1".
 - b. Turn both of the drive chain puller adjusting bolts "2" until the specified drive chain slack is obtained.

TIP

- To maintain the proper wheel alignment, adjust both sides evenly.
- There should be no clearance between the adjusting blocks and the head of adjusting bolts.



- c. Tighten the wheel axle nut to specification.



Wheel axle nut
105 N·m (10.5 kgf-m, 77 lb-ft)

- d. Tighten the drive chain puller locknuts to specification.



Drive chain puller locknut
16 N·m (1.6 kgf-m, 12 lb-ft)

EAS30803

LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out quickly. Therefore, the drive chain should be serviced, especially when the vehicle is used in dusty areas.

This vehicle has a drive chain with small rubber O-rings between each side plate. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these O-rings. Therefore, use only kerosene to clean the drive chain. Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for O-ring chains. Do not use any other lubricants on the drive chain since they may contain solvents that could damage the O-rings.



Recommended lubricant
Chain lubricant suitable for O-ring chains

EAS30845

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Check:

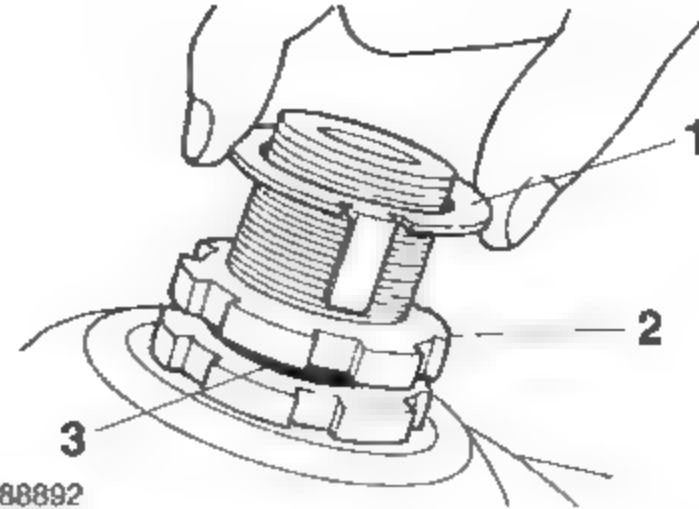
- Steering head
Grasp the bottom of the front fork legs and gently rock the front fork.
Blinding/looseness → Adjust the steering head.

3. Remove:

- Upper bracket
Refer to "STEERING HEAD" on page 4-74.

4. Adjust:

- Steering head
 - a. Remove the lock washer "1", upper ring nut "2", and rubber washer "3".

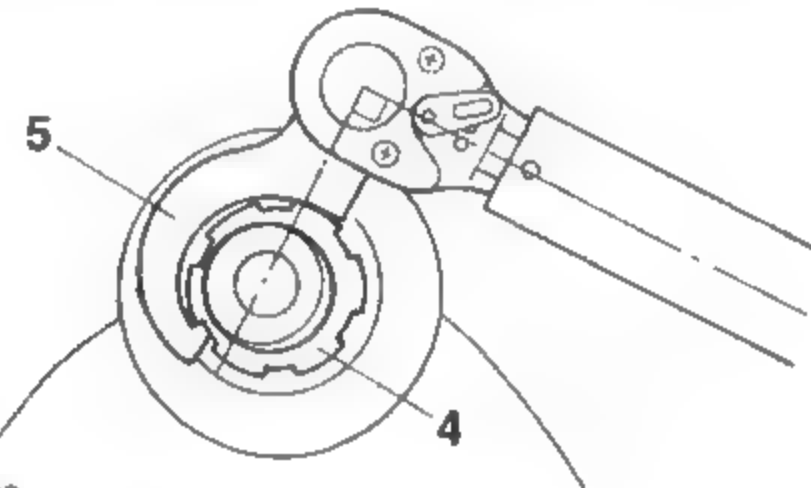


G088892

- b. Loosen the lower ring nut "4", and then tighten it to specification with a steering nut wrench "5".

TIP

- Set the torque wrench at a right angle to the steering nut wrench.
- Move the steering to the left and right a couple of times to check that it moves smoothly.



G088893



Steering nut wrench
90890-01403
Exhaust flange nut wrench
YU-A9472



Lower ring nut (initial tightening torque)
75 N·m (7.5 kgf·m, 55 lb·ft)


- c. Hold the front fork legs and move it to the left and right 5 times.

- d. Loosen the lower ring nut 165–195°, then tighten it to specification.

EWA13120

WARNING

Do not overtighten the lower ring nut.

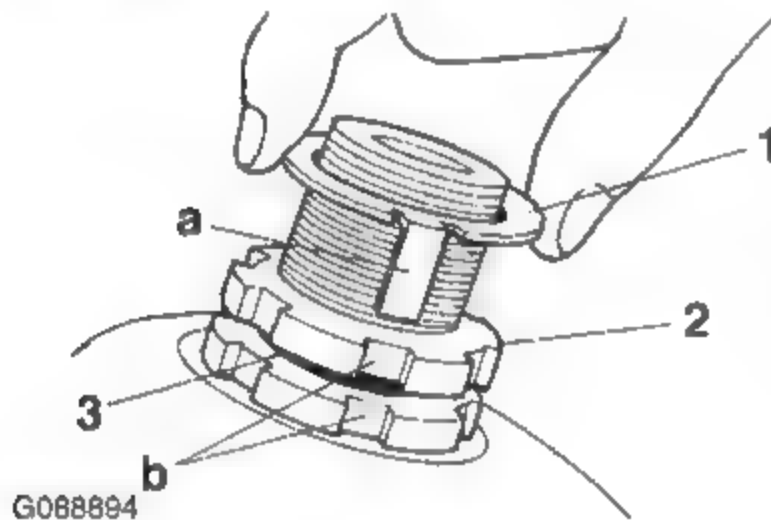


Lower ring nut (final tightening torque)
7 N·m (0.7 kgf·m, 5.2 lb·ft)

- e. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings. Refer to "STEERING HEAD" on page 4-74.
- f. Install the rubber washer "3".
- g. Install the upper ring nut "2".
- h. Finger tighten the upper ring nut "2", then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- i. Install the lock washer "1".

TIP

Make sure the lock washer tabs "a" sit correctly in the ring nut slots "b".



5. Install:
 - Upper bracket
 Refer to "STEERING HEAD" on page 4-74.

EAS30849

LUBRICATING THE STEERING HEAD

1. Lubricate:
 - Upper bearing
 - Lower bearing
 - Upper bearing cover
 - Lower bearing dust seal



Recommended lubricant
Lithium-soap-based grease

EAS30110

CHECKING THE CHASSIS FASTENERS

Make sure that all nuts, bolts, and screws are properly tightened.

EAS30804

LUBRICATING THE BRAKE LEVER

Lubricate the pivoting point and metal-to-metal moving parts of the lever.



Recommended lubricant
Silicone grease

EAS30649

LUBRICATING THE PEDALS

Lubricate the pivoting point and metal-to-metal moving parts of the pedals.



Recommended lubricant
Lithium-soap-based grease

EAS30805

LUBRICATING THE CLUTCH LEVER

Lubricate the pivoting point and metal-to-metal moving parts of the lever.



Recommended lubricant
Lithium-soap-based grease

EAS30850

CHECKING THE SIDESTAND

1. Check:
 - Sidestand operation
 Check that the sidestand moves smoothly.
Rough movement → Repair or replace.

EAS30851

LUBRICATING THE SIDESTAND

Lubricate the pivoting point, metal-to-metal moving parts and spring contact point of the sidestand.



Recommended lubricant
Molybdenum disulfide grease

EAS30852

CHECKING THE SIDESTAND SWITCH

Refer to "CHECKING THE SWITCHES" on page 8-37.

EAS30853

CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.



WARNING
Securely support the vehicle so that there is no danger of it falling over.

2. Check:
 - Inner tube
Damage/scratches → Replace.
 - Front fork leg
Oil leaks between inner tube and outer tube
→ Replace the oil seal.

3. Hold the vehicle upright and apply the front brake.
4. Check:
 - Front fork operation
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
Rough movement → Repair.
Refer to "FRONT FORK" on page 4-64.

EAS30806

ADJUSTING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

Rebound damping

ECA13580

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - Rebound damping
 - a. Turn the adjusting screw "1" in direction "a" or "b".

Direction "a"

Rebound damping is increased (suspension is harder).

Direction "b"

Rebound damping is decreased (suspension is softer).



Rebound damping

Adjustment value from the start position (Soft)

17

Adjustment value from the start position (STD)

17

Adjustment value from the start position (Hard)

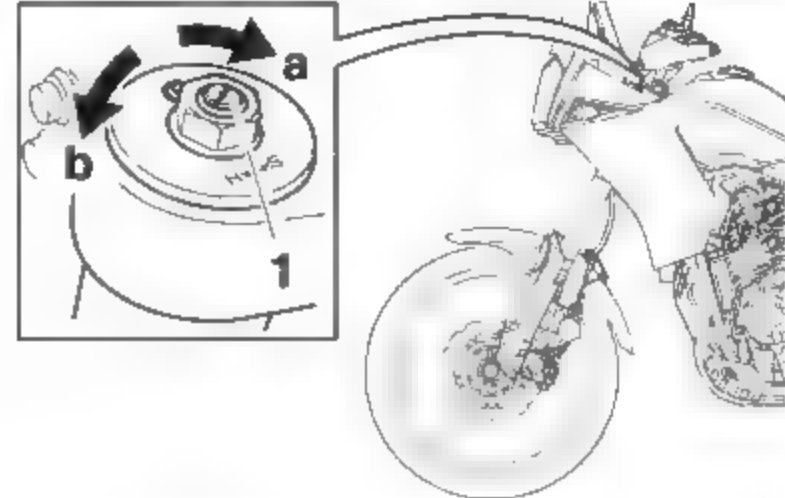
0

* With the adjusting screw fully turned in direction "a"

TIP

Although the total number of clicks of a damping force adjusting mechanism may not exactly match the above specifications due to small differences in production, the actual number of

clicks always represents the entire adjusting range. To obtain a precise adjustment, it would be advisable to check the number of clicks of each damping force adjusting mechanism and to modify the specifications as necessary.



Compression damping

ECA13580

NOTICE

Never go beyond the maximum or minimum adjustment positions.

TIP

Before adjusting the compression damping, remove the rubber cap.

1. Adjust:
 - Compression damping
 - a. Turn the adjusting screw "1" in direction "a" or "b".

Direction "a"

Compression damping is increased (suspension is harder).

Direction "b"

Compression damping is decreased (suspension is softer).



Compression damping

Adjustment value from the start position (Soft)

19

Adjustment value from the start position (STD)

11

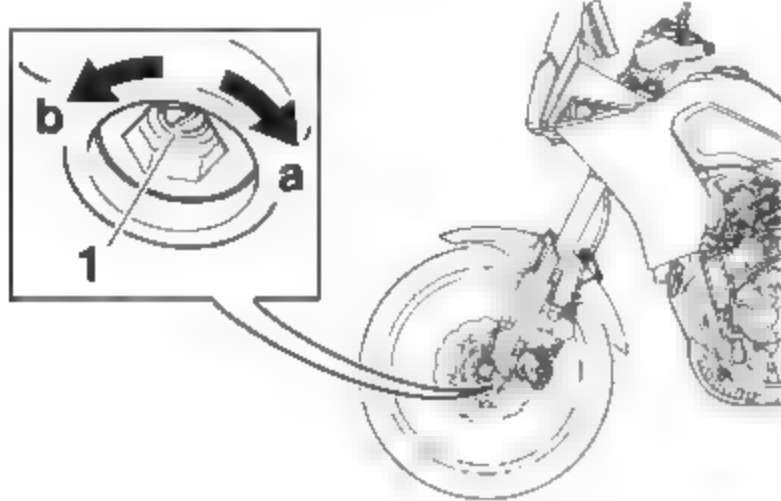
Adjustment value from the start position (Hard)

0

* With the adjusting screw fully turned in direction "a"

TIP

Although the total number of clicks of a damping force adjusting mechanism may not exactly match the above specifications due to small differences in production, the actual number of clicks always represents the entire adjusting range. To obtain a precise adjustment, it would be advisable to check the number of clicks of each damping force adjusting mechanism and to modify the specifications as necessary.



EAS32166

AIR BLEEDING FROM FRONT FORK

When the temperature increases in the front fork during touring, the air pressure increases in the fork and the suspension will become less flexible.

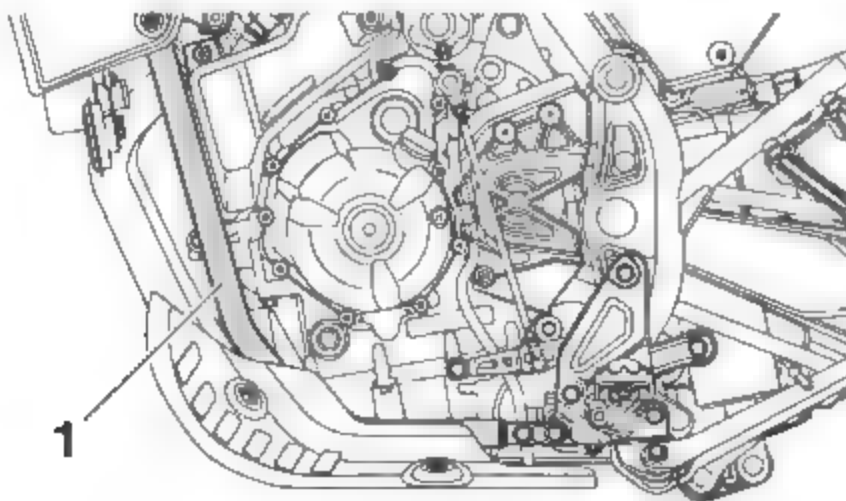
Bleed following procedure.

1. Stand the vehicle on a level surface.

ECA27170

NOTICE

Down tubes "1" are not designed to lift the vehicle. Do not lift the vehicle with a jack-up stand by putting it under the down tubes.



TIP

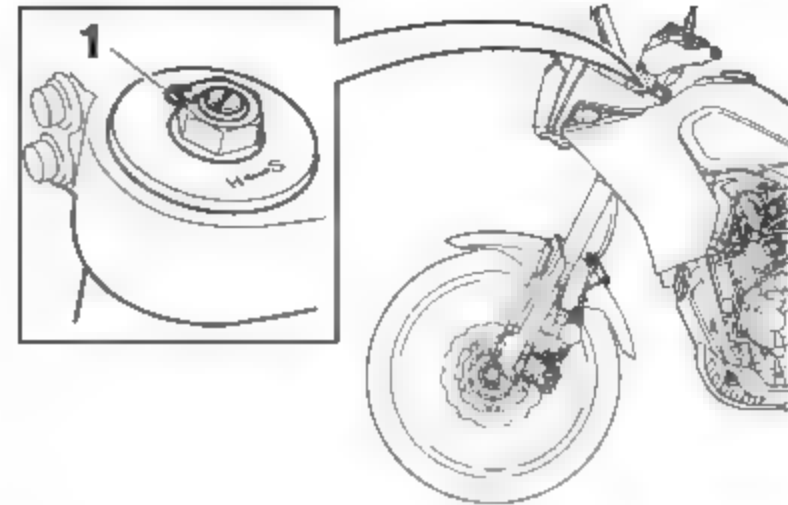
Stand the vehicle vertically using an appropriate stand, and bleed the air from the front fork.

2. Make sure the front wheel is off the ground and the area near the bleed screws is clean.
3. Bleed the air from the front fork.
Bleed the air from the front fork by removing bleed screw "1".

EWA13150

WARNING

- Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.
- Securely support the motorcycle so that there is no danger of it falling over.



4. Install:

- Bleed screw



Bleed screw

1.3 N·m (0.13 kgf·m, 0.95 lb·ft)

EAS30808

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

Refer to "CHECKING THE REAR SHOCK ABSORBER ASSEMBLY" on page 4-80.

EAS30855

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

EWA13170

WARNING

Securely support the vehicle so that there is no danger of it falling over.

Spring preload

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:

- Spring preload
 - a. Turn the adjusting knob "1" in direction "a" or "b".

Direction "a"

Spring preload is increased (suspension is harder).

Direction "b"

Spring preload is decreased (suspension is softer).



Spring preload

Adjustment value (Soft)

0

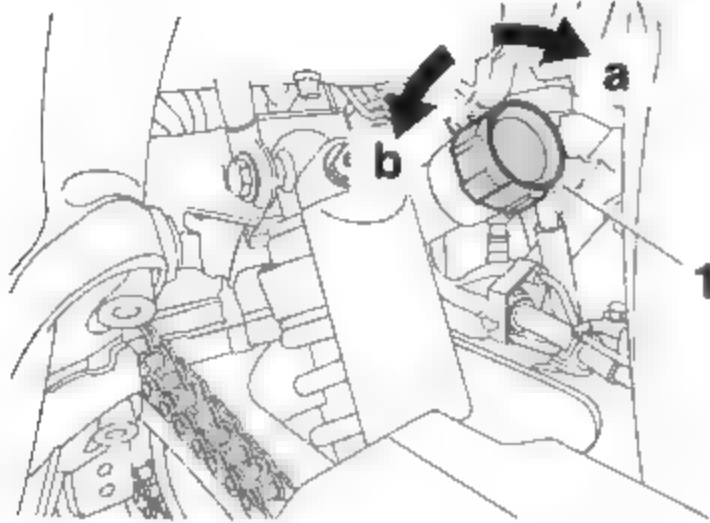
Adjustment value (STD)

10

Adjustment value (Hard)

24

* With the adjusting knob fully turned in direction "b"



Rebound damping

ECA13580

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:

- Rebound damping
 - a. Turn the adjusting screw "1" in direction "a" or "b".

Direction "a"

Rebound damping is increased (suspension is harder).

Direction "b"

Rebound damping is decreased (suspension is softer).



Rebound damping

Adjustment value from the start position (Soft)

23

Adjustment value from the start position (STD)

13

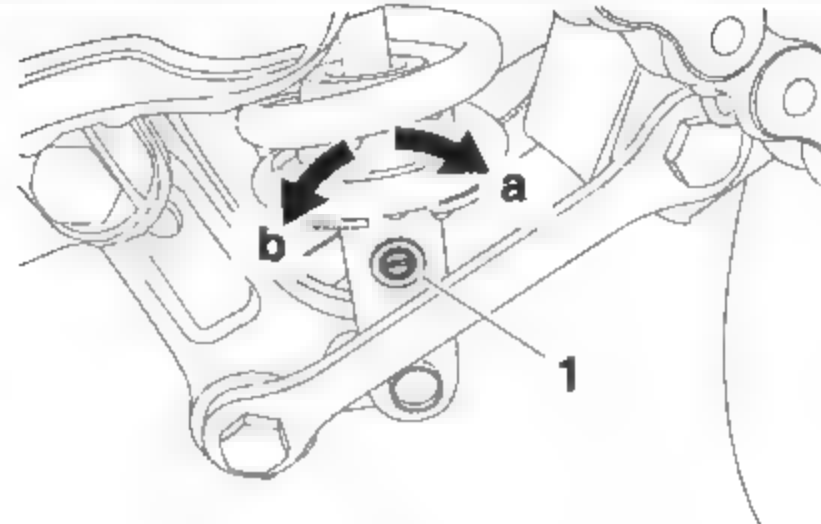
Adjustment value from the start position (Hard)

0

* With the adjusting screw fully turned in direction "a"

TIP

To obtain a precise adjustment, it is advisable to check the actual total number of turns of the damping force adjusting mechanism. This adjustment range may not exactly match the specifications listed due to small differences in production.



Compression damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:

- Compression damping
 - a. Turn the adjusting screw "1" in direction "a" or "b".

Direction "a"

Compression damping is increased (suspension is harder).

Direction "b"

Compression damping is decreased (suspension is softer).



Compression damping

Adjustment value from the start position (Soft)

18

Adjustment value from the start position (STD)

15

Adjustment value from the start position (Hard)

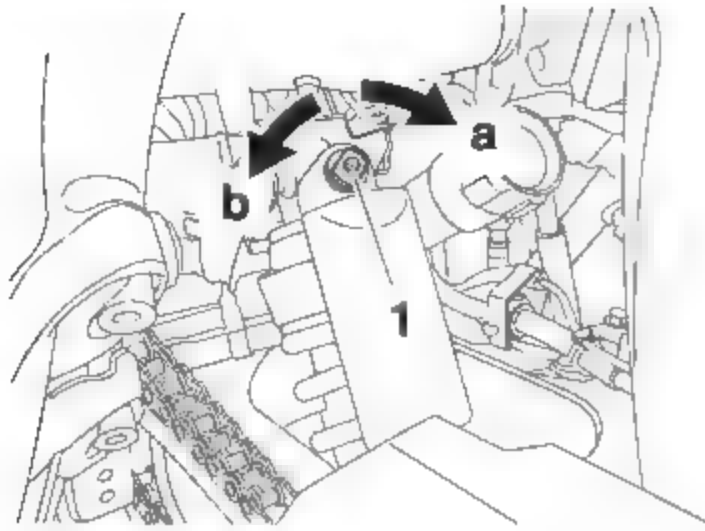
0

* With the adjusting screw fully turned in direction "a"

TIP

To obtain a precise adjustment, it is advisable to check the actual total number of turns of the damping force adjusting mechanism. This ad-

justment range may not exactly match the specifications listed due to small differences in production.



EAS33503

LUBRICATING THE REAR SUSPENSION LINK PIVOTS

1. Lubricate:

- Collars
- Relay arm
- Swingarm



Recommended lubricant
Lithium-soap-based grease

Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-78 and "SWINGARM" on page 4-82.

EAS30856

CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.

2. Start the engine, warm it up for several minutes, and then turn it off.

3. Check:

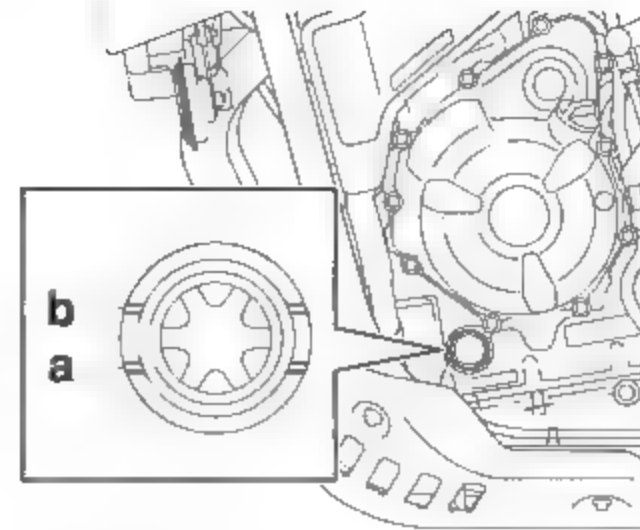
- Engine oil level

The engine oil level should be between the minimum level mark "a" and maximum level mark "b".

Below the minimum level mark → Add the recommended engine oil to the proper level.

TIP

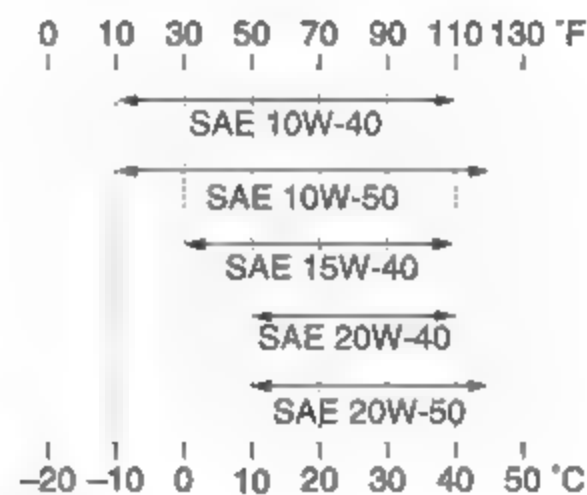
Before checking the engine oil level, wait a few minutes until the oil has settled.



Recommended brand
YAMALUBE

SAE viscosity grades
10W-40, 10W-50, 15W-40, 20W-40 or 20W-50

Recommended engine oil grade
API service SG type or higher,
JASO standard MA



ECA13381

NOTICE

- Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a grade of "CD" or higher and do not use oils labeled "ENERGY CONSERVING II".
- Do not allow foreign materials to enter the crankcase.

4. Start the engine, warm it up for several minutes, and then turn it off.

5. Check the engine oil level again.

TIP

Before checking the engine oil level, wait a few minutes until the oil has settled.

EAS30857

CHANGING THE ENGINE OIL

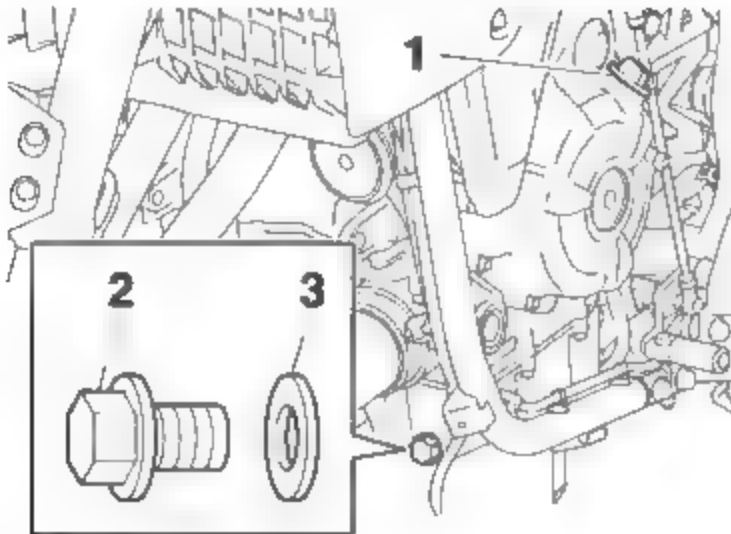
1. Remove:

- Engine guard

Refer to "ENGINE REMOVAL" on page 5-10.

PERIODIC MAINTENANCE

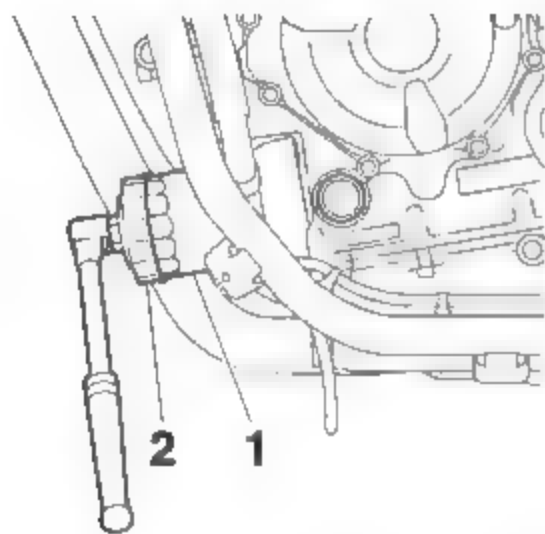
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Place a container under the engine oil drain bolt.
4. Remove:
 - Engine oil filler cap "1"
 - Engine oil drain bolt "2" (along with the gasket "3")



5. Drain:
 - Engine oil (completely from the oil pan)
6. If the oil filter cartridge is also to be replaced, perform the following procedure.
 - a. Remove the oil filter cartridge "1" with an oil filter wrench "2".



Oil filter wrench
90890-01426
Oil filter wrench
YU-38411



- b. Lubricate the O-ring of the new oil filter cartridge with a thin coat of engine oil.

FGA25890

NOTICE

Make sure the O-ring is positioned correctly in the groove of the oil filter cartridge.

- c. Tighten the new oil filter cartridge to specification with an oil filter wrench.



Oil filter cartridge
17 N·m (1.7 kgf·m, 13 lb·ft)

7. Install:
 - Engine oil drain bolt (along with the gasket **New**)



Engine oil drain bolt
43 N·m (4.3 kgf·m, 32 lb·ft)

8. Fill:
 - Oil pan (with the specified amount of the recommended engine oil)



Engine oil quantity
Oil change
2.30 L (2.43 US qt, 2.02 Imp.qt)
With oil filter removal
2.60 L (2.75 US qt, 2.29 Imp.qt)
Quantity (disassembled)
3.00 L (3.17 US qt, 2.64 Imp.qt)

9. Install:
 - Engine oil filler cap (along with the O-ring **New**)
10. Start the engine, warm it up for several minutes, and then turn it off.
11. Check:
 - Engine (for engine oil leaks)
12. Check:
 - Engine oil level
Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-25.
13. Install:
 - Engine guard
Refer to "ENGINE REMOVAL" on page 5-10.

EAS30810

MEASURING THE ENGINE OIL PRESSURE

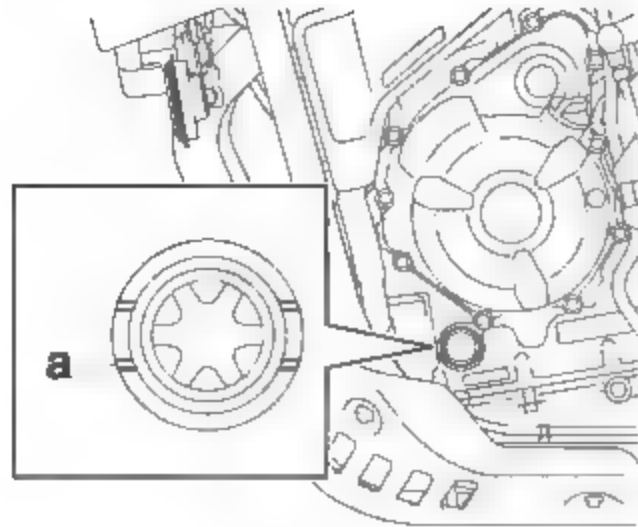
1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on a suitable stand.
- Make sure that the vehicle is upright.

2. Check:
 - Engine oil level
Below the minimum level mark "a" → Add the recommended engine oil to the proper level.

PERIODIC MAINTENANCE



3. Start the engine, warm it up for several minutes, and then turn it off.

ECA13410

NOTICE

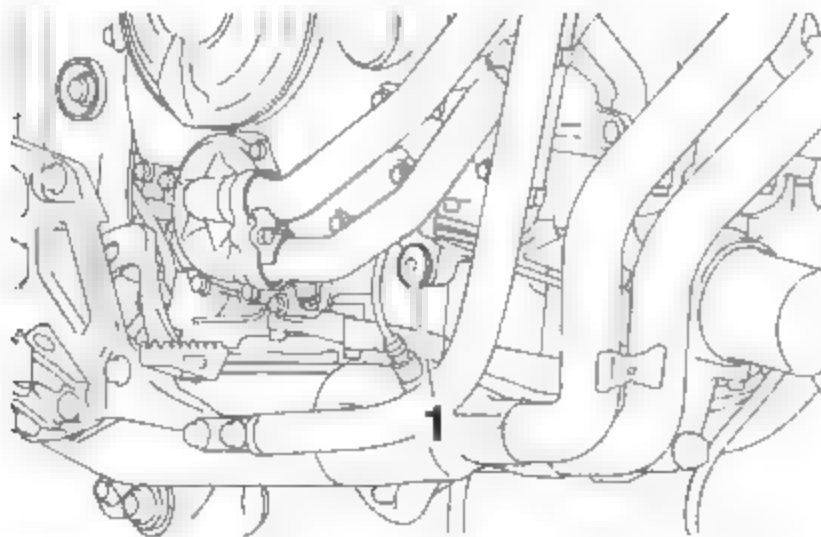
When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

4. Remove:
 - Engine guard
 Refer to "ENGINE REMOVAL" on page 5-10.
5. Tilt the vehicle to the left so that oil does not flow out of the main gallery.
6. Remove:
 - Main gallery bolt "1"

EWA12980

WARNING

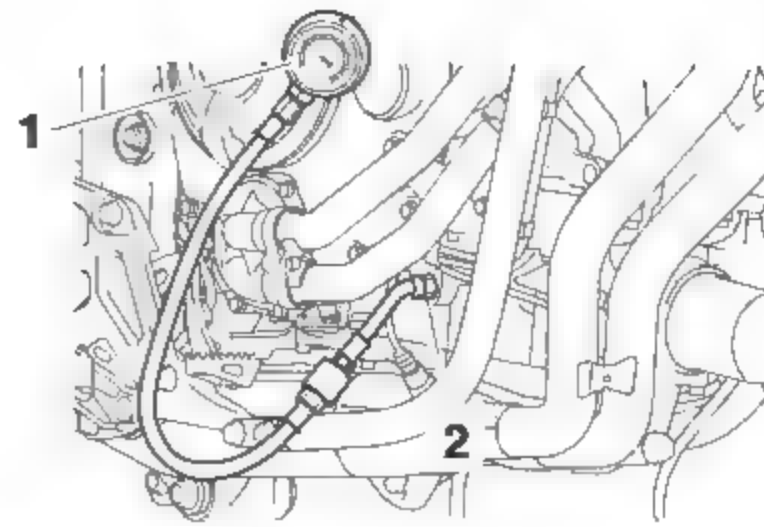
The engine, muffler and engine oil are extremely hot.



7. Install:
 - Oil pressure gauge "1"
 - Adapter "2"



Pressure gauge
90890-03153
Pressure gauge
YU-03153
Oil pressure adapter H
90890-03139



8. Stand the vehicle on a level surface.

TIP

- Place the vehicle on the suitable stand.
- Make sure that the vehicle is upright.

9. Measure:

- Engine oil pressure
(at the following conditions)



Oil pressure
280.0 kPa/5000 r/min (2.80 kgf/cm²/5000 r/min, 40.6 psi/5000 r/min)

Out of specification → Check.

Engine oil pressure	Possible causes
Below specification	<ul style="list-style-type: none"> • Faulty oil pump • Clogged oil filter • Leaking oil passage • Broken or damaged oil seal
Above specification	<ul style="list-style-type: none"> • Leaking oil passage • Faulty oil filter • Oil viscosity too high

10. Install:

- Main gallery bolt
- O-ring **New**



Main gallery bolt
8 N·m (0.8 kgf-m, 5.9 lb-ft)

TIP

Lubricate the O-ring with a thin coat of lithium-soap-based grease.

11. Install:

- Engine guard



Engine guard bolt
11 N·m (1.1 kgf-m, 8.1 lb-ft)

EAS30811

CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

TIP

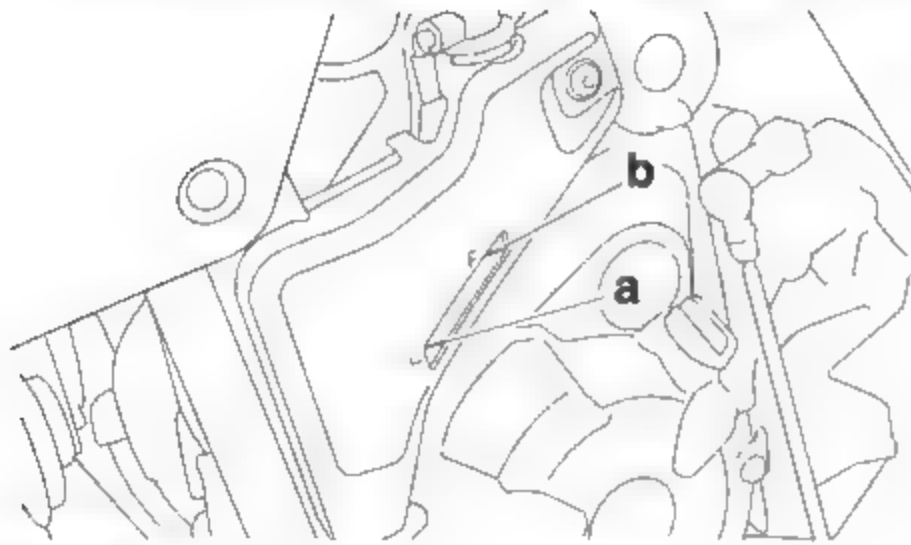
- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.

2. Check:

- Coolant level

The coolant level should be between the minimum level mark "a" and maximum level mark "b".

Below the minimum level mark → Add the recommended coolant to the proper level.



ECA13470

NOTICE

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.

3. Start the engine, warm it up for several minutes, and then turn it off.

4. Check:

- Coolant level

TIP

Before checking the coolant level, wait a few minutes until it settles.

EAS30812

CHECKING THE COOLING SYSTEM

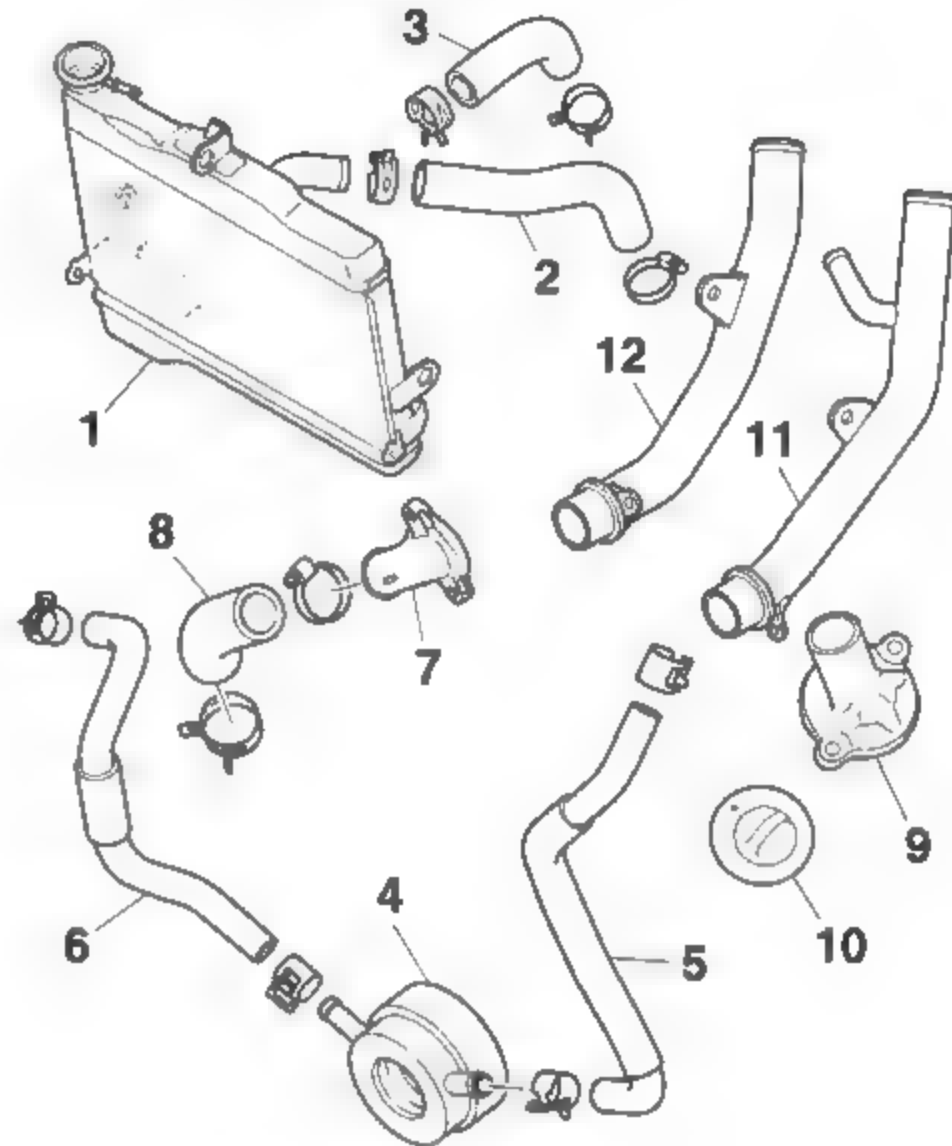
1. Check:

- Radiator "1"
- Radiator inlet hose "2"
- Radiator outlet hose "3"
- Oil cooler "4"
- Oil cooler inlet hose "5"
- Oil cooler outlet hose "6"
- Water jacket joint "7"
- Water jacket joint inlet hose "8"

- Thermostat cover "9"
- Thermostat "10"
- Water pump inlet pipe "11"
- Water pump outlet pipe "12"

Cracks/damage → Replace.

Refer to "RADIATOR" on page 6-2, "OIL COOLER" on page 6-5, and "WATER PUMP" on page 6-9.



EAS30813

CHANGING THE COOLANT

1. Remove:

- Air scoop (right)

Refer to "GENERAL CHASSIS (3)" on page 4-5.

2. Remove:

- Radiator cap bolt "1"
- Radiator cap "2"

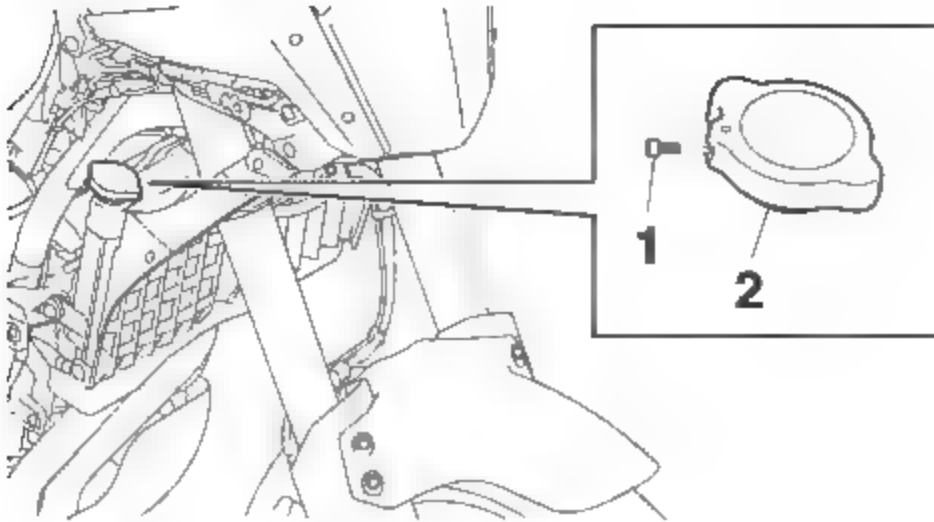
EWA13030

WARNING

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

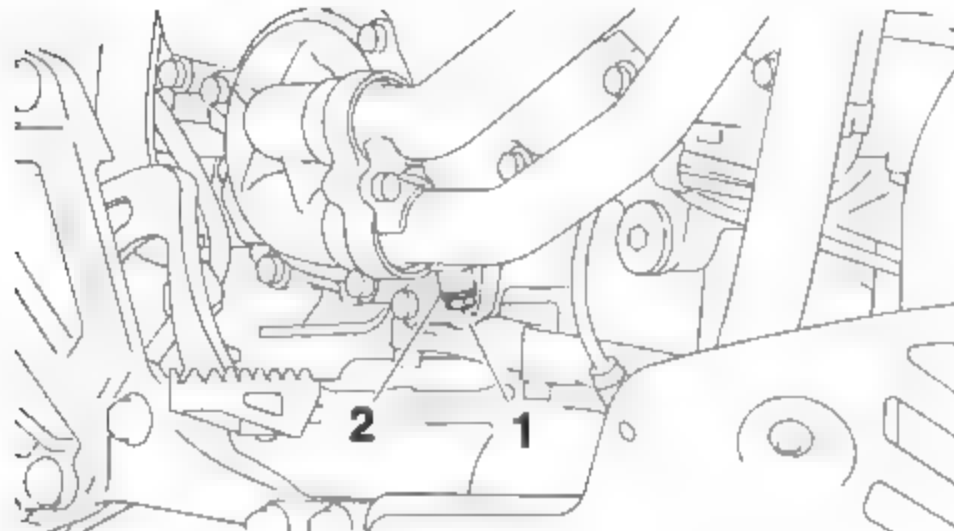
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.

PERIODIC MAINTENANCE



3. Remove:

- Coolant drain bolt "1"
- Copper washer "2"

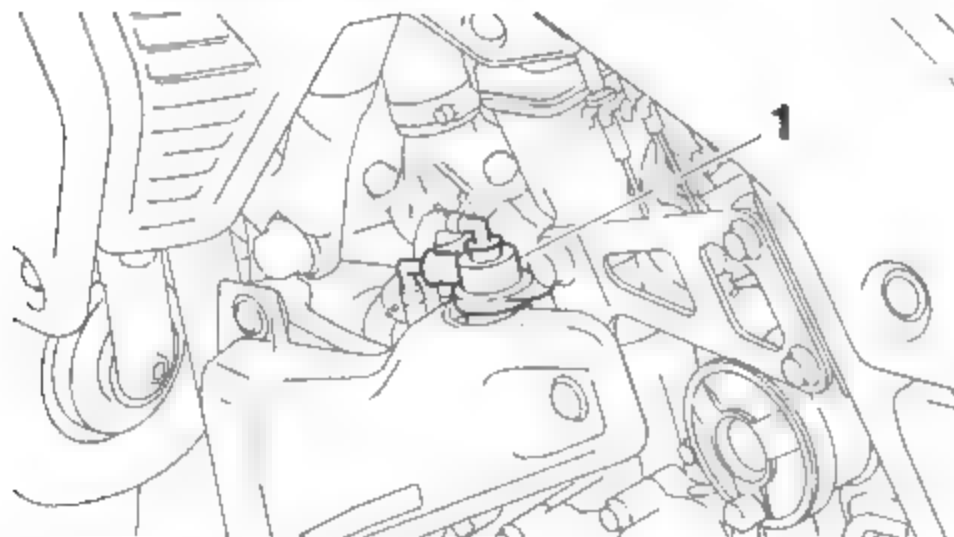


4. Drain:

- Coolant
(from the engine and radiator)

5. Remove:

- Coolant reservoir cap "1"



6. Drain:

- Coolant
(from the coolant reservoir)

7. Install:

- Coolant drain bolt
- Copper washer **New**



Coolant drain bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)

8. Fill:

- Cooling system
(with the specified amount of the recommended coolant)



Recommended antifreeze

High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines

Mixing ratio

1:1 (antifreeze: water)

Coolant quantity

Radiator (including all routes)

1.60 L (1.69 US qt, 1.41 Imp. qt)

Coolant reservoir (up to the maximum level mark)

0.25 L (0.26 US qt, 0.22 Imp. qt)

Handling notes for coolant

Coolant is potentially harmful and should be handled with special care.

WARNING

- If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.
- If coolant is swallowed, induce vomiting and get immediate medical attention.

ECA13481

NOTICE

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant, check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- If coolant comes into contact with painted surfaces, immediately wash them with water.
- Do not mix different types of antifreeze.

9. Install:

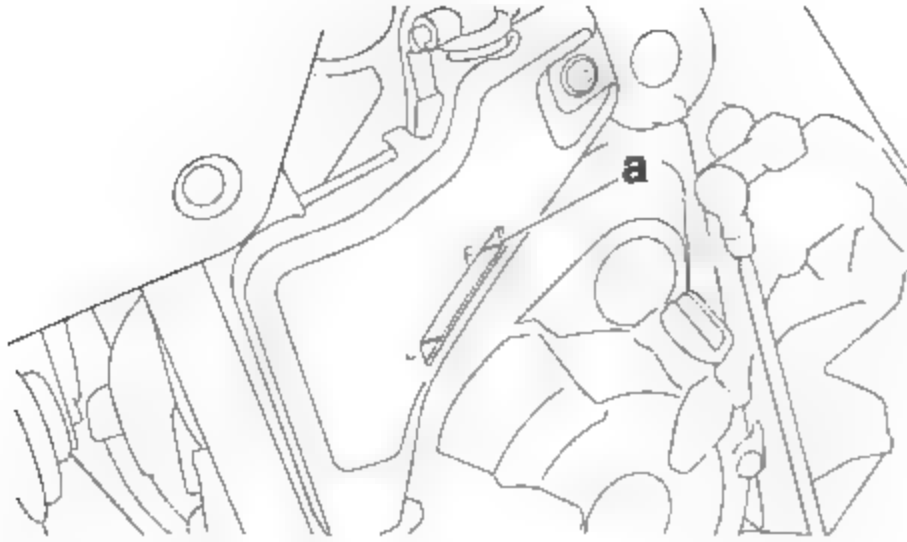
- Radiator cap
- Radiator cap bolt



Radiator cap bolt
1.0 N·m (0.10 kgf·m, 0.73 lb·ft)

10. Fill:

- Coolant reservoir
(with the recommended coolant to the maximum level mark "a")



11. Install:

- Coolant reservoir cap

12. Start the engine, warm it up for several minutes, and then turn it off.

13. Check:

- Coolant level
Refer to "CHECKING THE COOLANT LEVEL" on page 3-28.

TIP

Before checking the coolant level, wait a few minutes until the coolant has settled.

14. Install:

- Air scoop (right)
Refer to "GENERAL CHASSIS (3)" on page 4-5.

EAS30814

CHECKING THE FRONT BRAKE LIGHT SWITCH

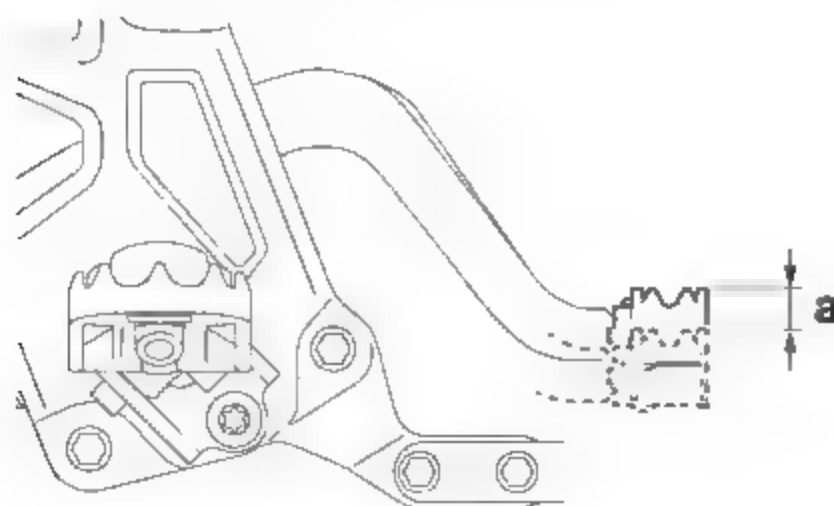
Refer to "CHECKING THE SWITCHES" on page 8-37.

EAS30859

ADJUSTING THE REAR BRAKE LIGHT SWITCH

1. Check:

- Rear brake light operation timing "a"
Out of specification → Adjust.



2. Adjust:

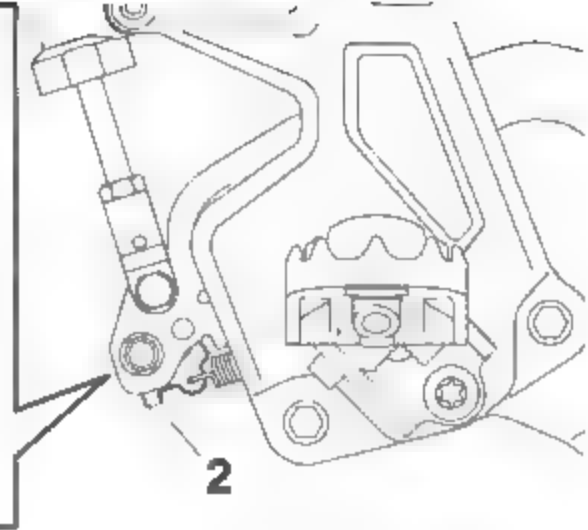
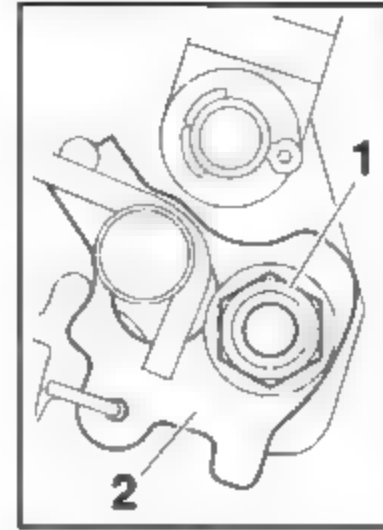
- Rear brake light operation timing

- Loosen the nut "1".
- Adjust the rear brake plate "2" until the specified rear brake light operation timing is obtained.
- Tighten the nut to specification.



Nut

7 N·m (0.7 kgf·m, 5.2 lb·ft)



EAS30860

CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the inner and outer cables.

EWA13270

WARNING

Damaged outer cable may cause the cable to corrode and interfere with its movement. Replace damaged outer cable and inner cables as soon as possible.

1. Check:

- Outer cable
Damage → Replace.

2. Check:

- Cable operation
Rough movement → Lubricate.



Recommended lubricant

Engine oil or a suitable cable lubricant

TIP

Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubricating device.

EAS30861

CHECKING THE THROTTLE GRIP OPERATION

1. Check:

- Throttle cables
Damage/deterioration → Replace.
- Throttle cable installation
Incorrect → Reinstall the throttle cables.

Refer to "CABLE ROUTING" on page 2-13 and "HANDLEBAR" on page 4-57.

2. Check:

- Throttle grip movement
Rough movement → Lubricate or replace the defective part(s).



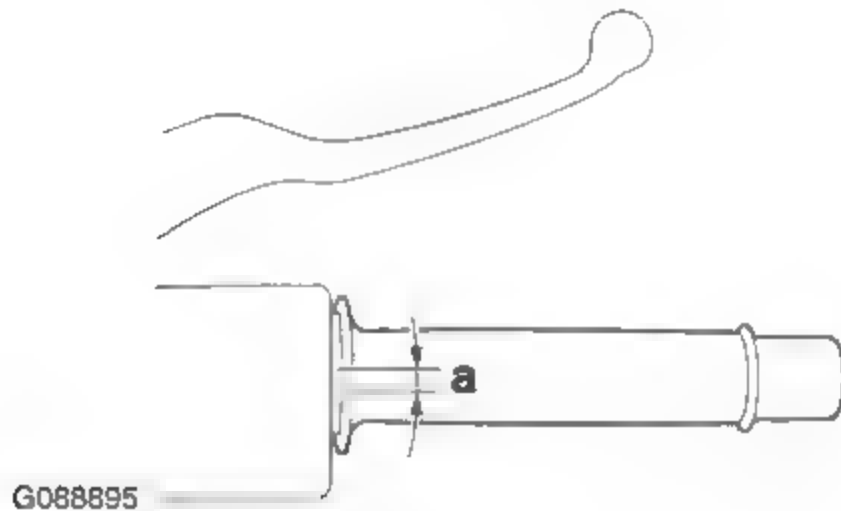
TIP

With the engine stopped, turn the throttle grip slowly and release it. Make sure that the throttle grip turns smoothly and returns properly when released.

Repeat this check with the handlebar turned all the way to the left and right.

3. Check:

- Throttle grip free play "a"
Out of specification → Adjust.



4. Adjust:

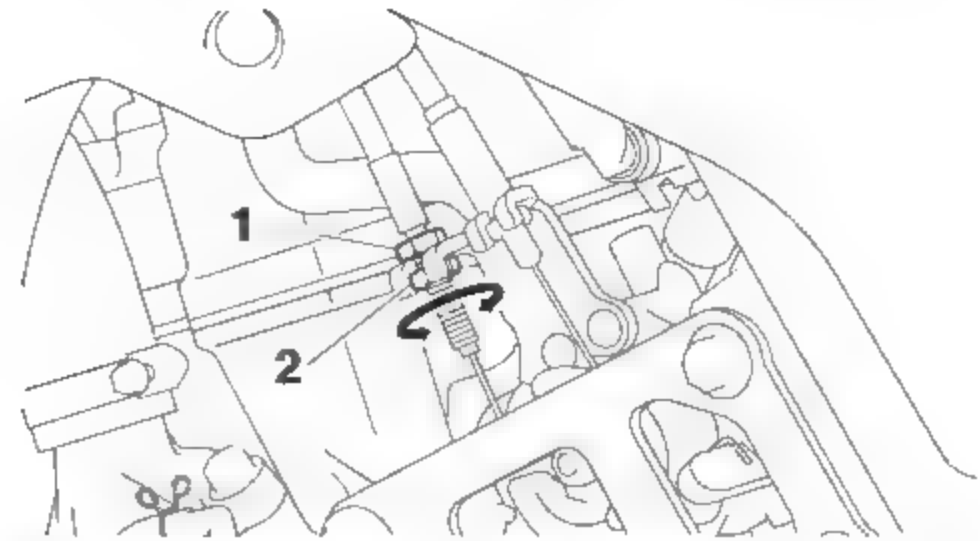
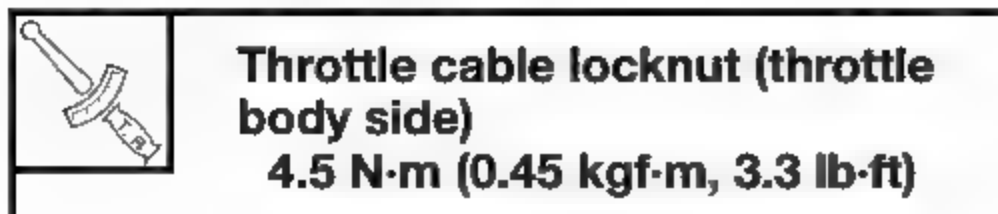
- Throttle grip free play

TIP

Prior to adjusting the throttle grip free play, throttle body synchronization should be adjusted properly. Refer to "SYNCHRONIZING THE THROTTLE BODIES" on page 3-9.

Throttle body side

- Loosen the locknut "1" on the accelerator cable.
- Turn the adjusting nut "2" until the specified throttle grip free play is obtained.
- Tighten the locknut.

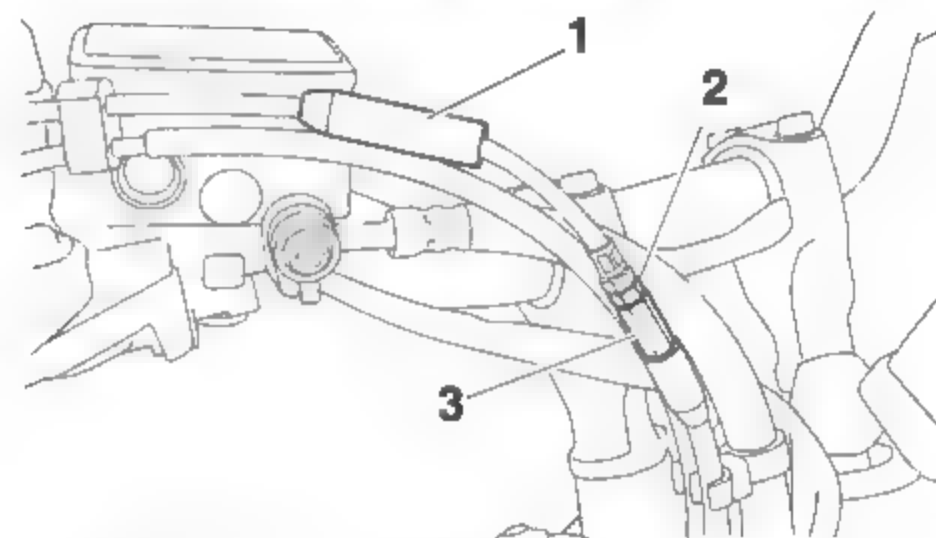


TIP

If the specified throttle grip free play cannot be obtained on the throttle body side of the cable, use the adjusting nut on the handlebar side.

Handlebar side

- Slide back the rubber cover "1".
- Loosen the locknut "2".
- Turn the adjusting nut "3" until the specified throttle grip free play is obtained.



- Tighten the locknut.



Throttle cable locknut (handlebar side)
4.3 N·m (0.43 kgf·m, 3.2 lb·ft)

- Slide the rubber cover to its original position.

TIP

Make sure that the adjusting nut is covered completely by the rubber cover.

EAS30816

CHECKING AND CHARGING THE BATTERY

Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.

EAS30882

CHECKING THE FUSES

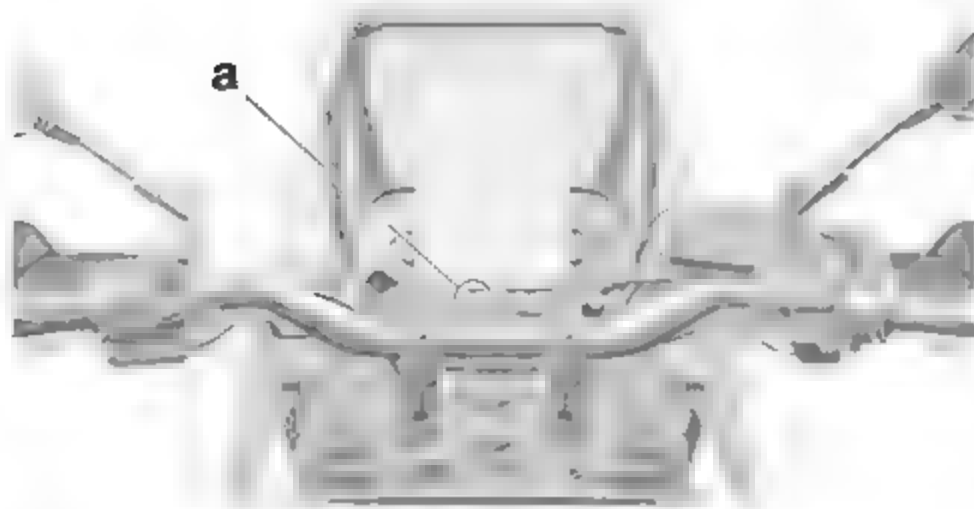
Refer to "CHECKING THE FUSES" on page 8-38.

EAS30124

ADJUSTING THE HEADLIGHT BEAMS

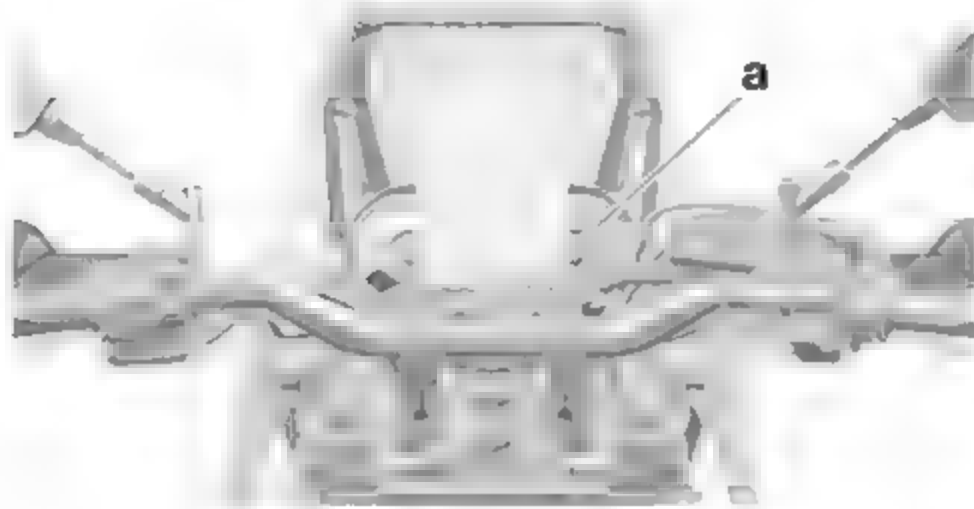
1. Adjust:

- Headlight beams (vertically—left side)
 - a. Insert a 4 mm hexagon wrench into the hole “a” and turn the adjusting bolt.



2. Adjust:

- Headlight beams (vertically—right side)
 - a. Insert a 4 mm hexagon wrench into the hole “a” and turn the adjusting bolt.

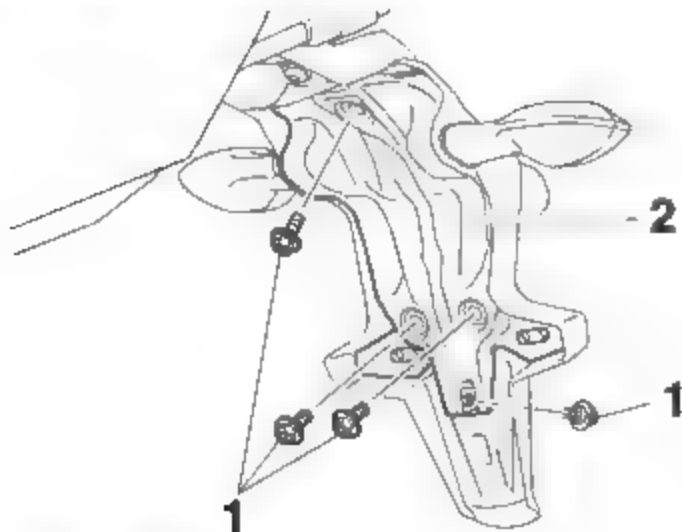


EAS31831

REPLACING THE LICENSE PLATE LIGHT BULB

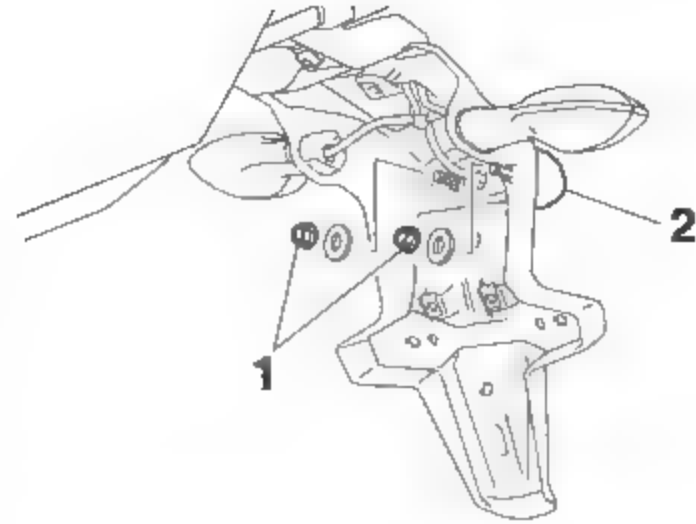
1. Remove:

- Lower fender cover bolts “1”
- Lower fender cover “2”



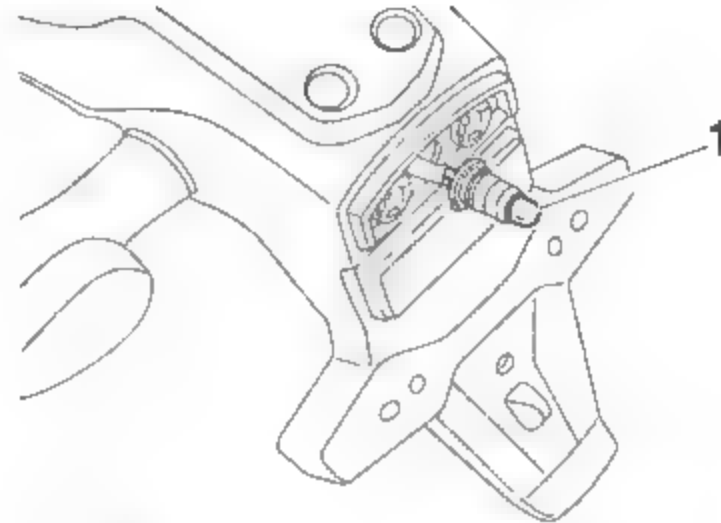
2. Remove:

- License plate light unit nuts “1”
- License plate light cover “2”



3. Remove:

- License plate light bulb “1”



4. Install:

- License plate light bulb **New**

5. Install:

- License plate light cover
- License plate light unit
- Lower fender cover



License plate light cover nut
 3.8 N·m (0.38 kgf·m, 2.8 lb·ft)
Lower fender cover bolt
 4.0 N·m (0.40 kgf·m, 3.0 lb·ft)

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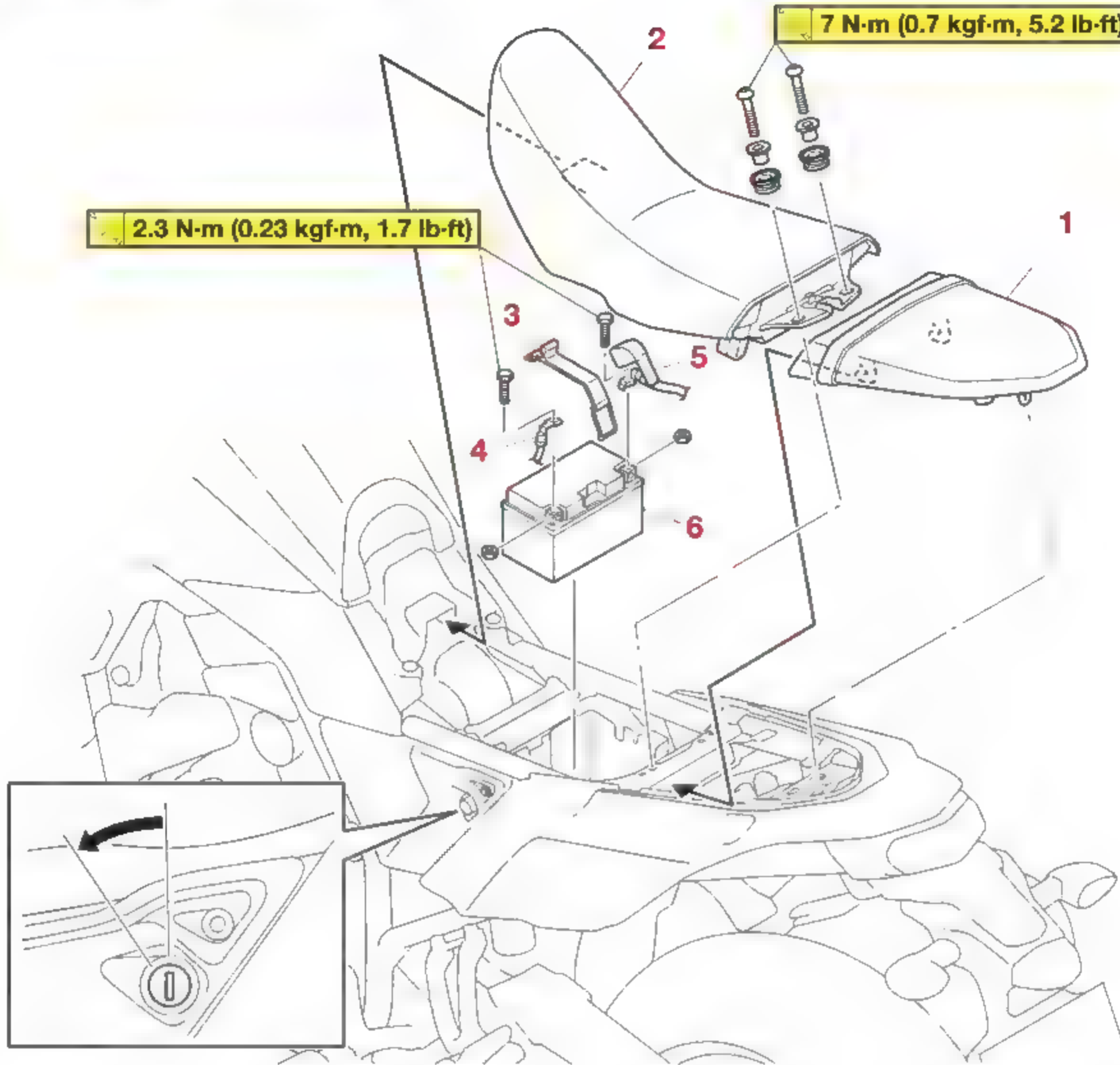
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EAS20026

GENERAL CHASSIS (1)

Removing the seats and battery

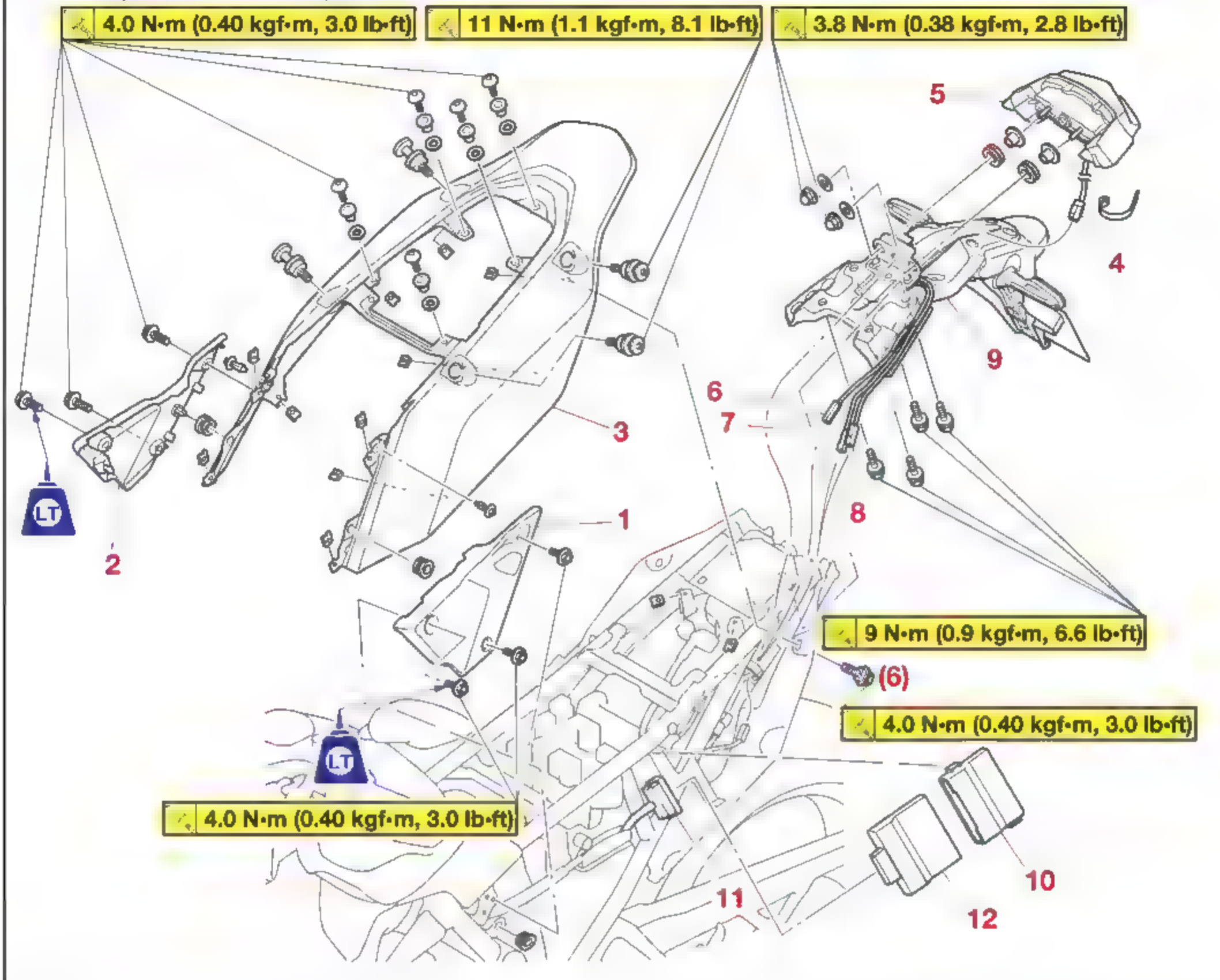


Order	Job/Parts to remove	Q'ty	Remarks
1	Passenger seat	1	
2	Rider seat	1	
3	Battery band	1	
4	Negative battery lead	1	Disconnect.
5	Positive battery lead	1	Disconnect.
6	Battery	1	

EAS20155

GENERAL CHASSIS (2)

Removing the tail/brake light assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Side cover (left)	1	
2	Side cover (right)	1	
3	Tail cover	1	
4	Tail/brake light coupler	1	Disconnect.
5	Tail/brake light assembly	1	
6	License plate light coupler	1	
7	Rear turn signal light coupler (right)	1	Disconnect.
8	Rear turn signal light coupler (left)	1	Disconnect.
9	Rear fender assembly	1	
10	ECU cover	1	
11	ECU coupler	1	Disconnect.
12	ECU (Engine Control Unit)	1	

EAS31264

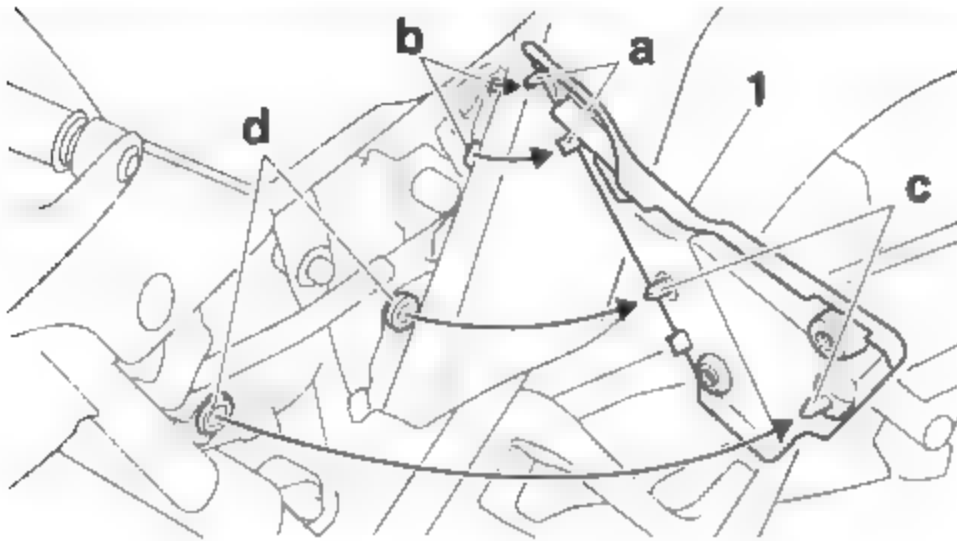
REMOVING THE SIDE COVERS

The following procedure applies to both of the side covers.

1. Remove:
 - Side cover "1"

TIP

Remove the projections "a" on the side cover from holes "b" on the tail cover, and then remove the projections "c" from the grommets "d".



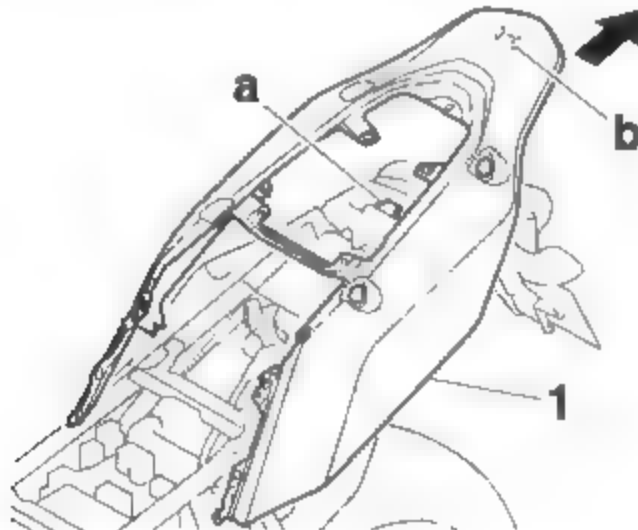
EAS33139

REMOVING THE TAIL COVER

1. Remove:
 - Tail cover "1"

TIP

Unhook the projection "a" on the rear fender assembly from the hole "b" on tail cover.



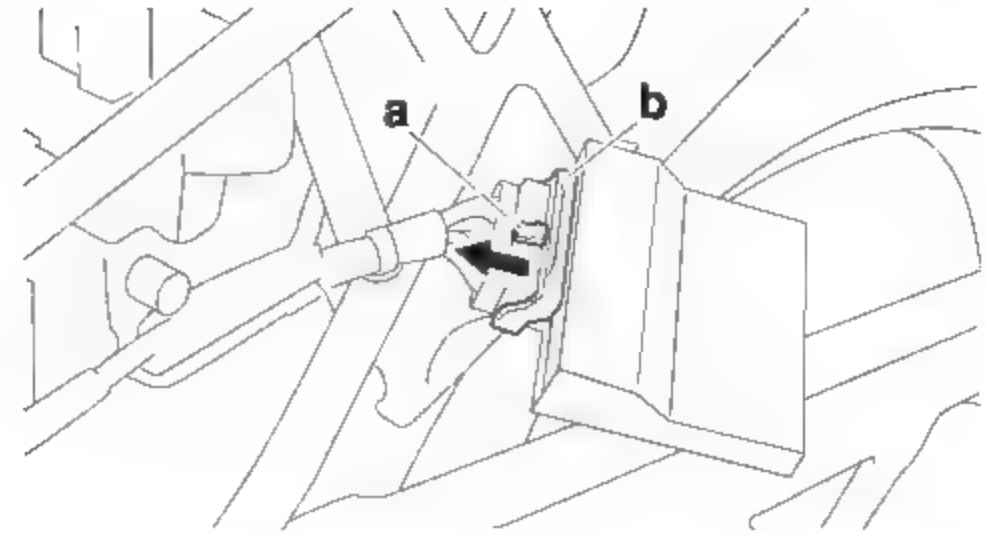
EAS31641

REMOVING THE ECU (engine control unit)

1. Disconnect:
 - ECU coupler

TIP

While pushing the projection "a" and move the lock lever "b" of the ECU coupler in the direction of the arrow shown in the illustration to disconnect the coupler.



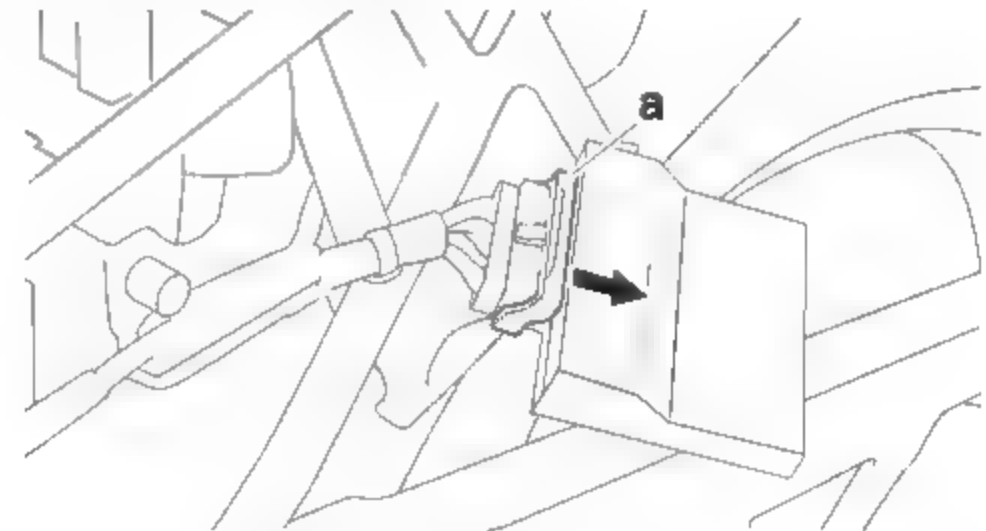
EAS31842

INSTALLING THE ECU (engine control unit)

1. Connect:
 - ECU coupler

TIP

Push the lock lever "a" of the ECU coupler in the direction of the arrow shown in the illustration to connect the coupler.



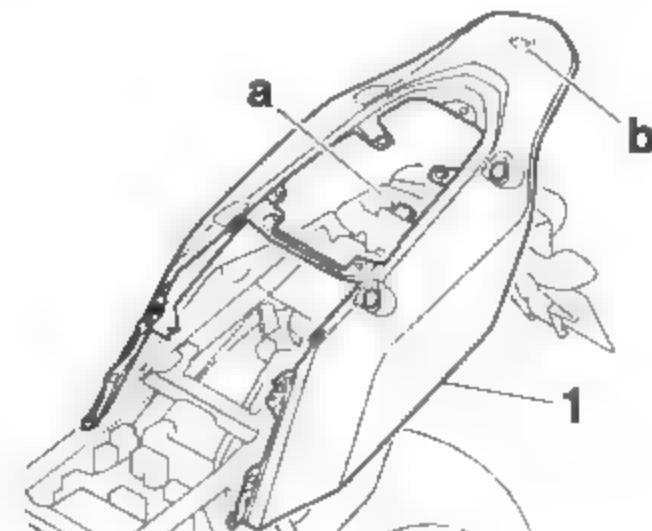
EAS33140

INSTALLING THE TAIL COVER

1. Install:
 - Tail cover "1"

TIP

Fit the projection "a" on the rear fender assembly into the hole "b" on the tail cover.



EAS31265

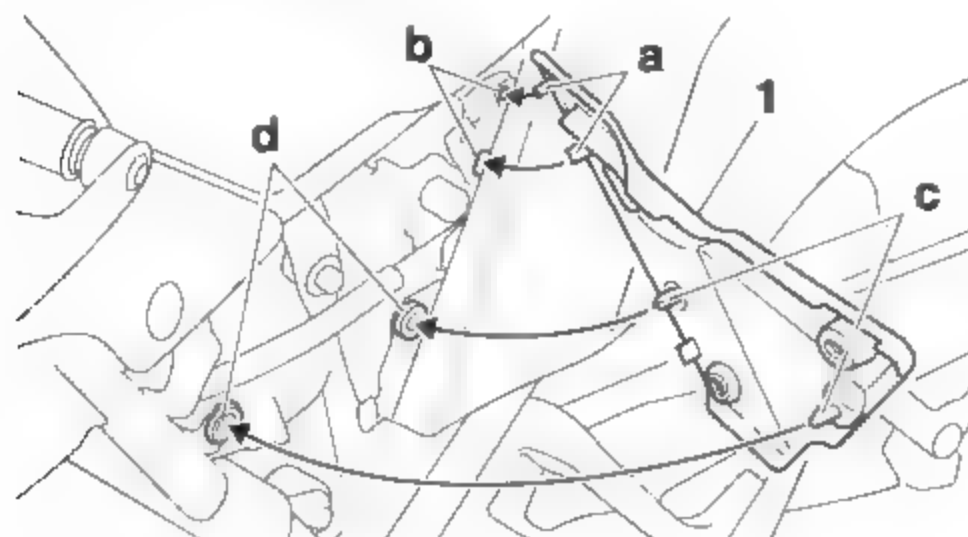
INSTALLING THE SIDE COVERS

The following procedure applies to both of the side covers.

1. Install:
 - Side cover "1"

TIP

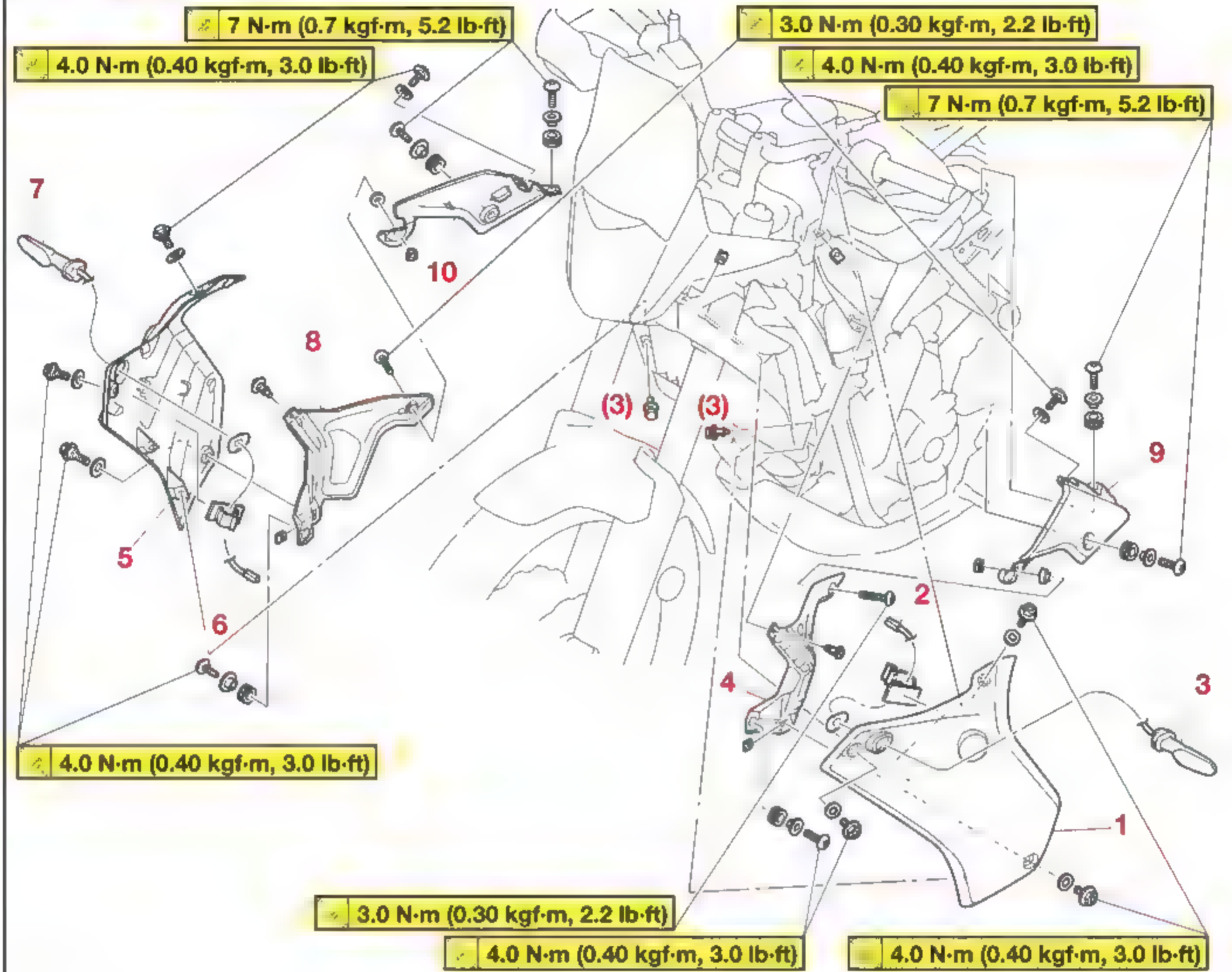
Fit the projections "a" on the side cover to the holes "b" in the tail cover, and then fit the projections "c" to the grommets "d".



EAS20158

GENERAL CHASSIS (3)

Removing the air scoops



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Air scoop (left)	1	
2	Front turn signal/position light coupler (left)	1	Disconnect.
3	Front turn signal/position light (left)	1	
4	Air duct (left)	1	
5	Air scoop (right)	1	
6	Front turn signal/position light coupler (right)	1	Disconnect.
7	Front turn signal/position light (right)	1	
8	Air duct (right)	1	
9	Fuel tank side cover (left)	1	
10	Fuel tank side cover (right)	1	

EAS31772

REMOVING THE AIR SCOOPS

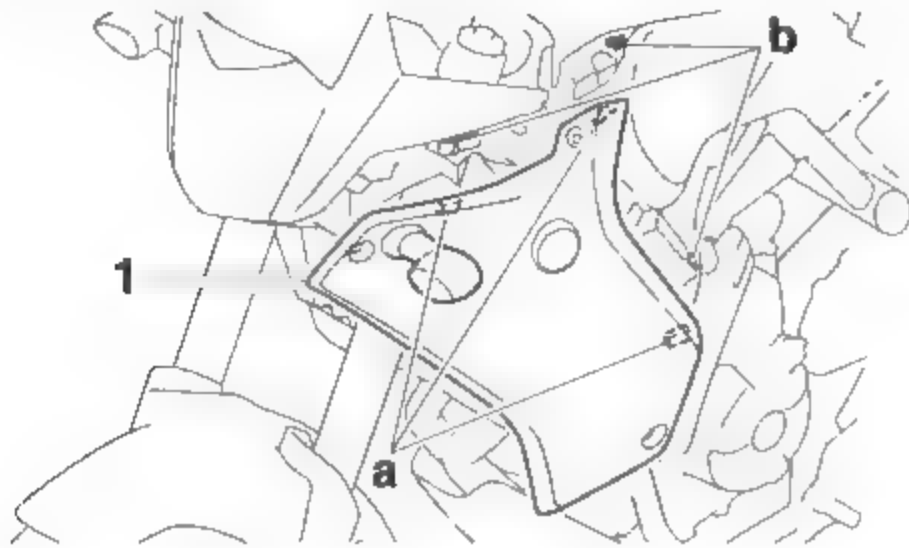
The following procedure applies to both of the air scoops.

1. Remove:

- Air scoop "1"

TIP

Remove the projections "a" on the air scoop from the holes "b".



EAS32396

REMOVING THE AIR DUCTS

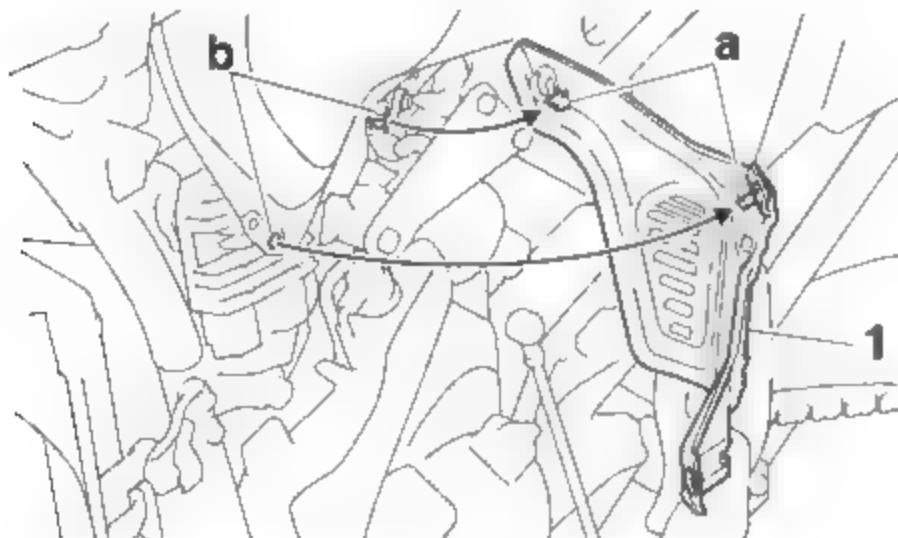
The following procedure applies to both of the air ducts.

1. Remove:

- Air duct "1"

TIP

Remove the projections "a" on the air duct from the holes "b".



EAS32777

REMOVING THE FUEL TANK SIDE COVERS

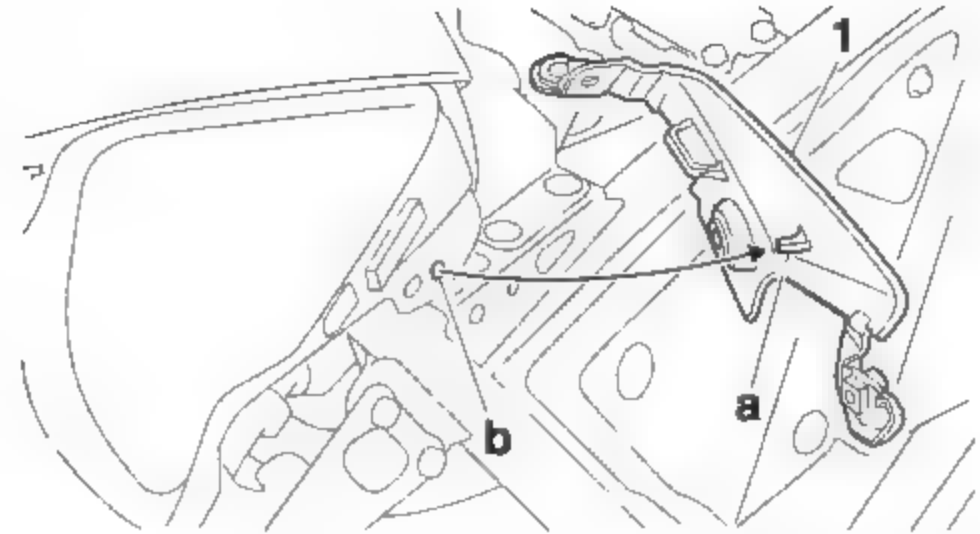
The following procedure applies to both of the fuel tank side covers.

1. Remove:

- Fuel tank side cover "1"

TIP

Remove the projection "a" on the fuel tank side cover from the hole "b".



EAS32778

INSTALLING THE FUEL TANK SIDE COVERS

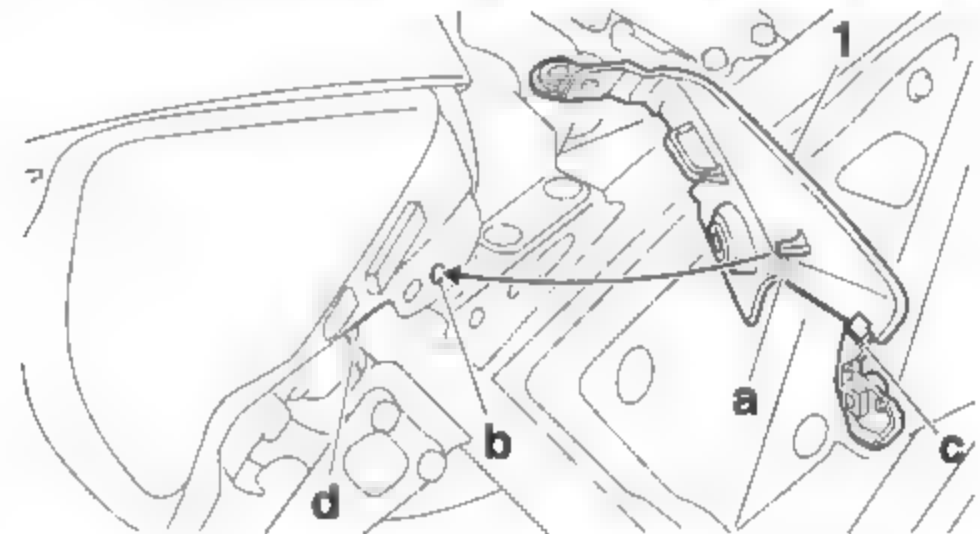
The following procedure applies to both of the fuel tank side covers.

1. Install:

- Fuel tank side cover "1"

TIP

- Fit the projection "a" on the fuel tank side cover to the hole "b" in the fuel tank.
- Engage the hook "c" on the fuel tank side cover to the fuel tank "d".



EAS31797

INSTALLING THE AIR DUCTS

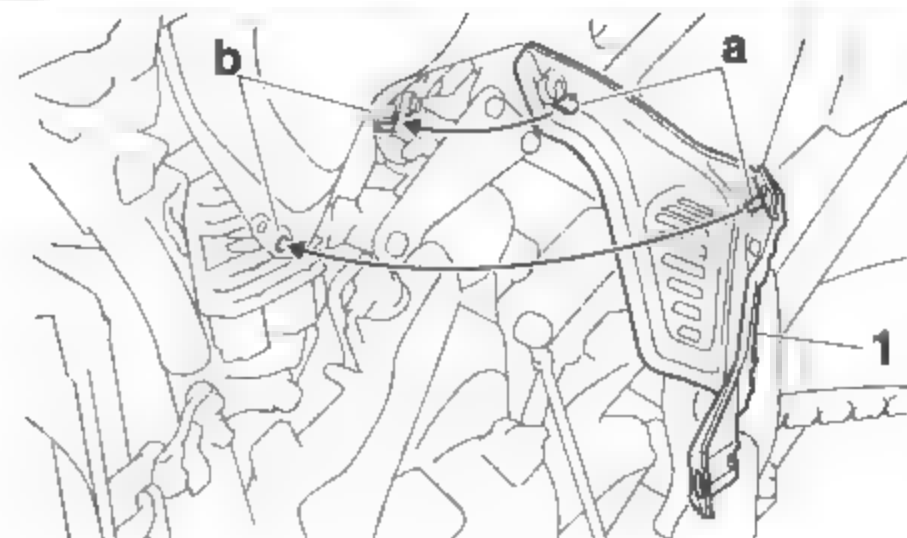
The following procedure applies to both of the air ducts.

1. Install:

- Air duct "1"

TIP

Fit the projections "a" on the air duct to the holes "b".



EAS31773

INSTALLING THE AIR SCOOPS

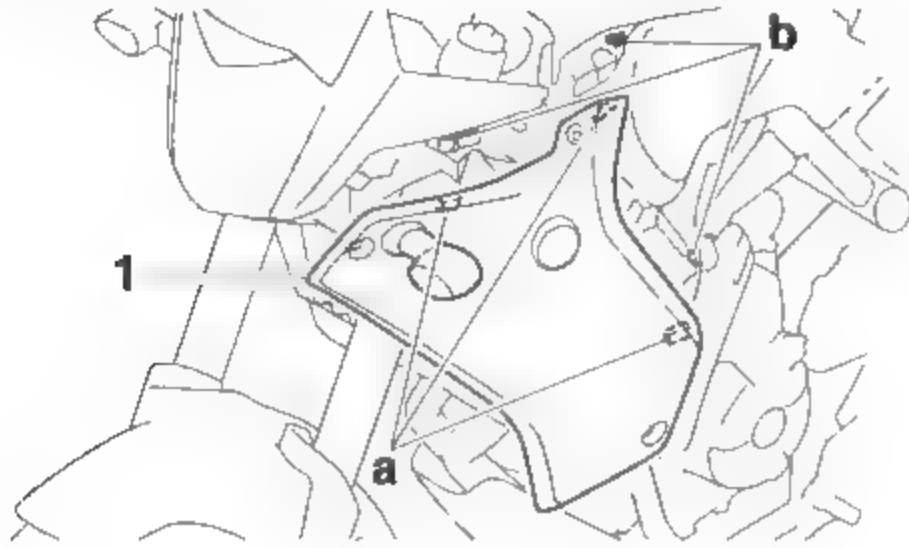
The following procedure applies to both of the air scoops.

1. Install:

- Air scoop "1"

TIP

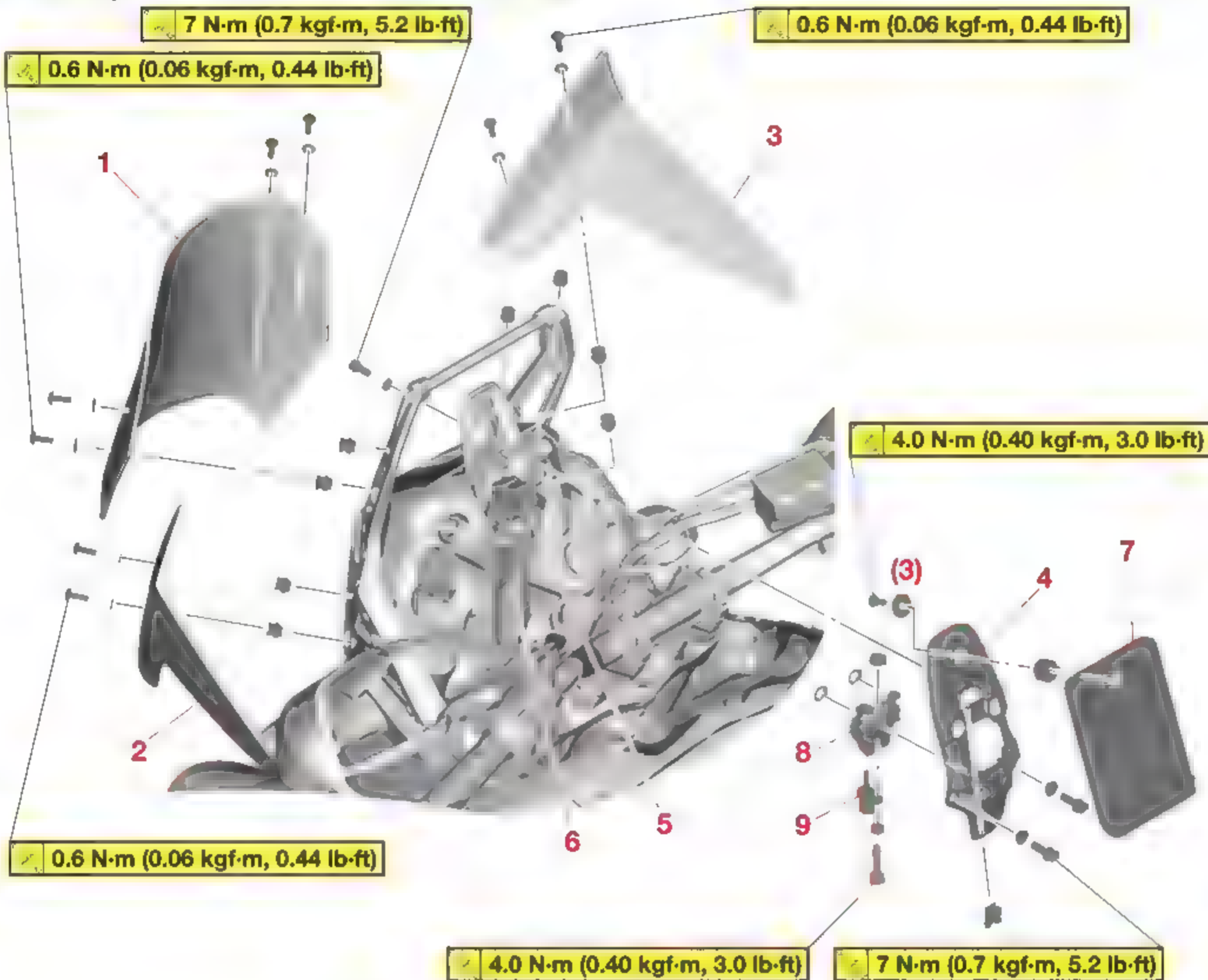
Fit the projections "a" on the air scoop to the holes "b".



EAS20157

GENERAL CHASSIS (4)

Removing the windshields and meter assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Windshield (center)	1	
2	Windshield (left)	1	
3	Windshield (right)	1	
4	Meter assembly bracket	1	
5	Meter assembly coupler	1	Disconnect.
6	Intake air temperature sensor coupler	1	Disconnect.
7	Meter assembly	1	
8	Intake air temperature sensor bracket	1	
9	Intake air temperature sensor	1	

EAS30141

INSTALLING THE WINDSHIELDS

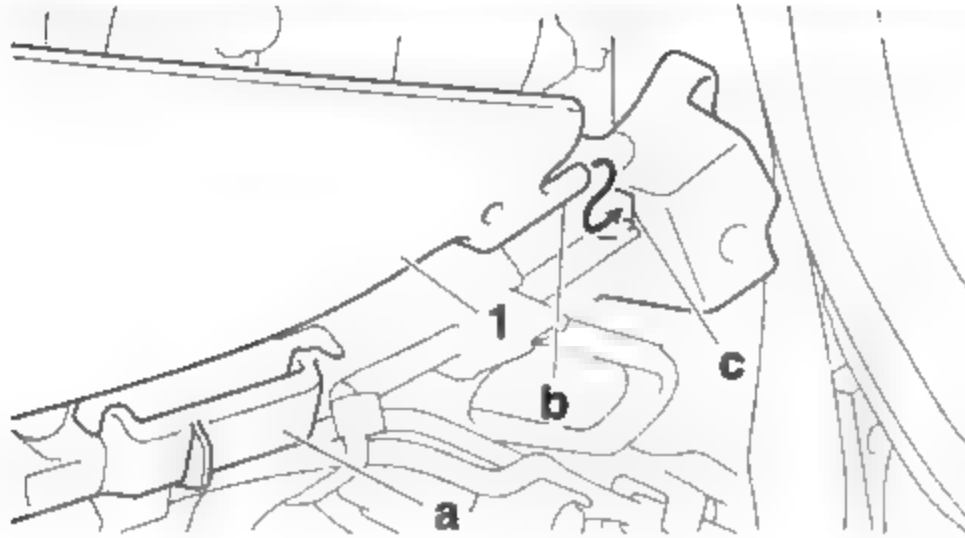
The following procedure applies to both of windshields.

1. Install:

- Windshield (left/right) "1"

TIP

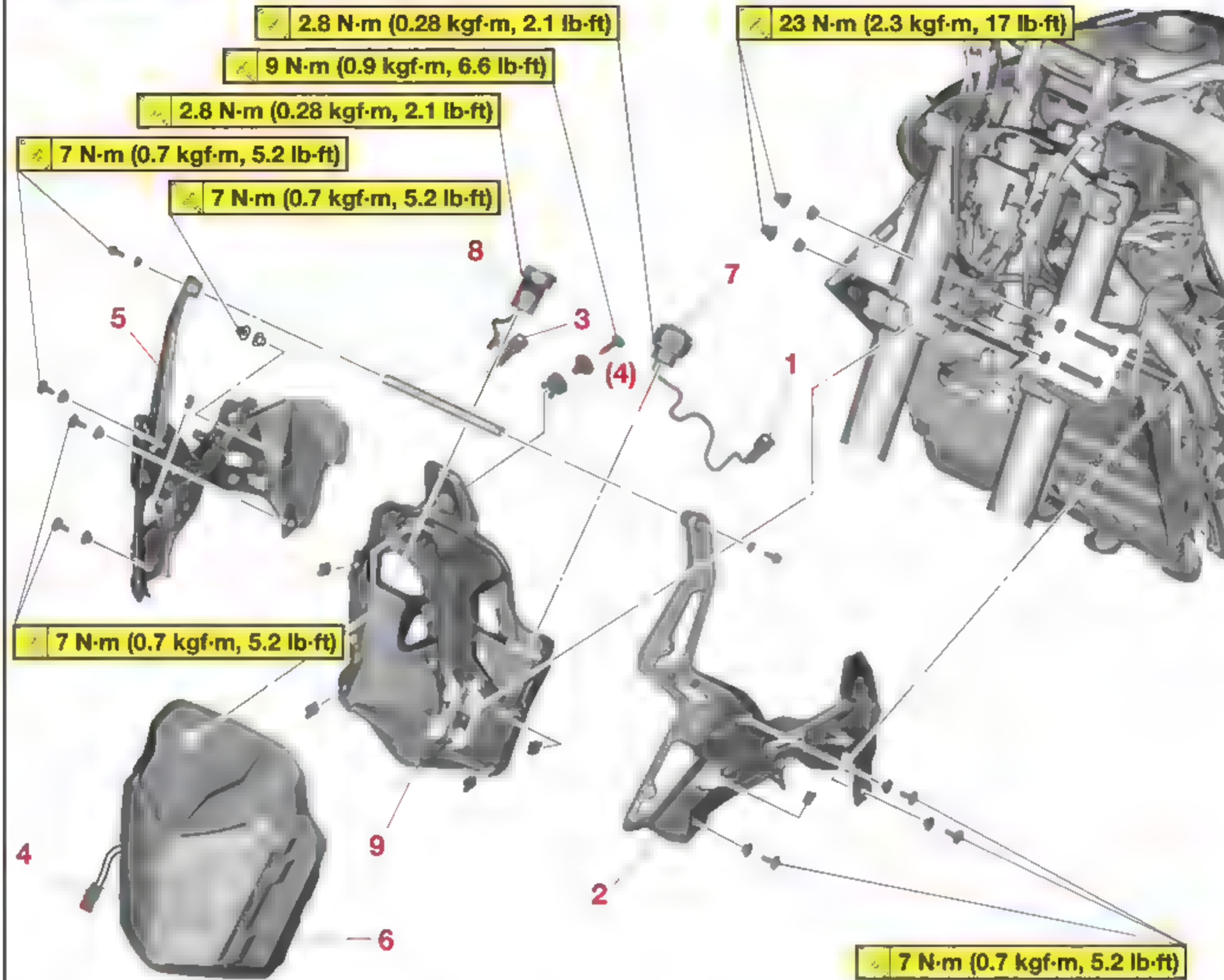
- Install the windshield to the inward of the portion "a" on the windshield inner panel.
- Fit the projection "b" on the windshield to the hole "c" in the windshield inner panel.



EAS20158

GENERAL CHASSIS (5)

Removing the headlight assembly

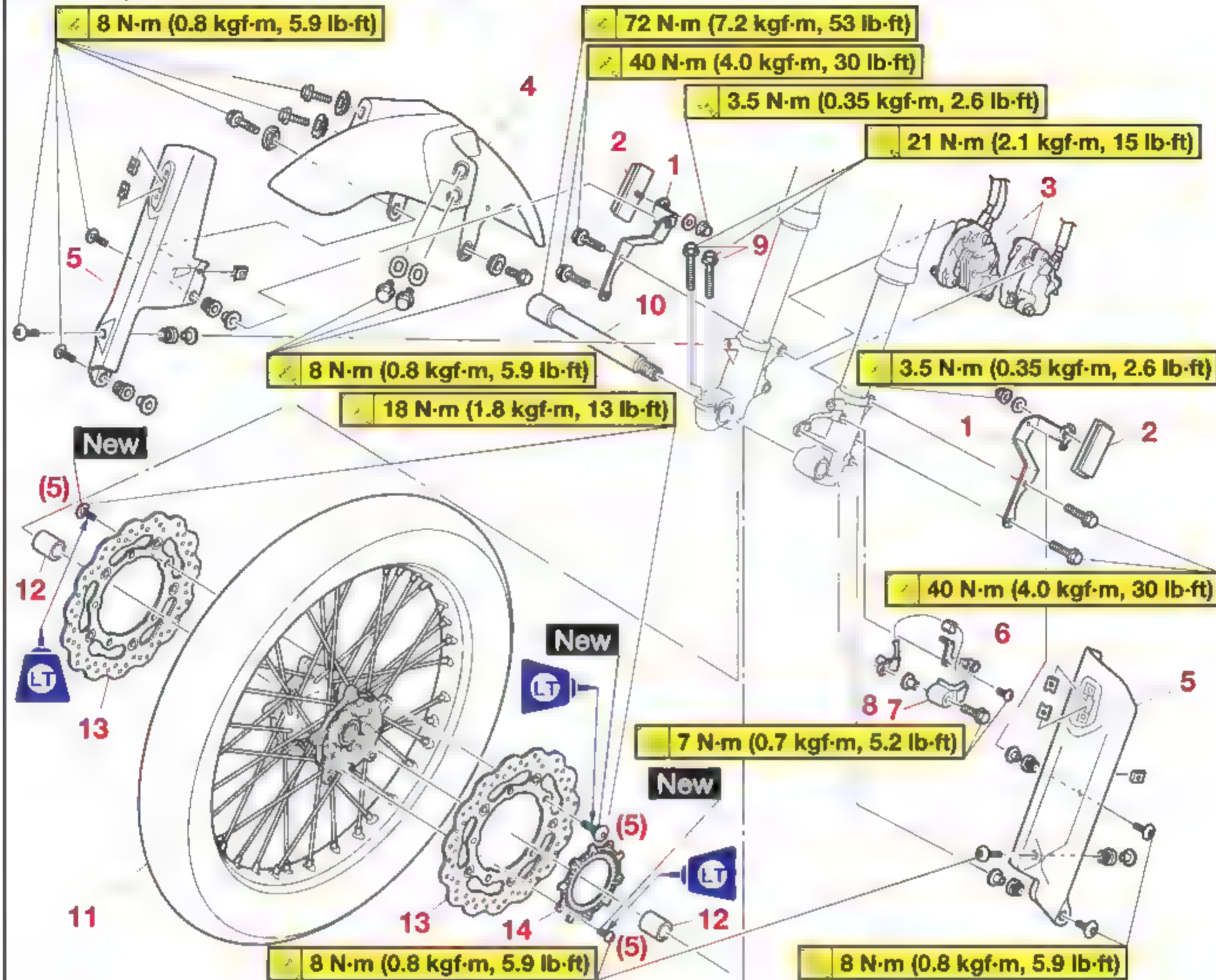


Order	Job/Parts to remove	Q'ty	Remarks
	Seat (rider/passenger)		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoop/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Windshield (center/left/right)/Meter assembly		Refer to "GENERAL CHASSIS (4)" on page 4-8.
1	"ABS ON" button coupler	1	Disconnect.
2	Windshield inner panel (left)	1	
3	USB port coupler	1	Disconnect.
4	Headlight coupler	1	Disconnect.
5	Windshield inner panel (right)	1	
6	Headlight assembly	1	
7	"ABS ON" button	1	
8	USB port	1	
9	Headlight inner cover	1	

EAS20028

FRONT WHEEL

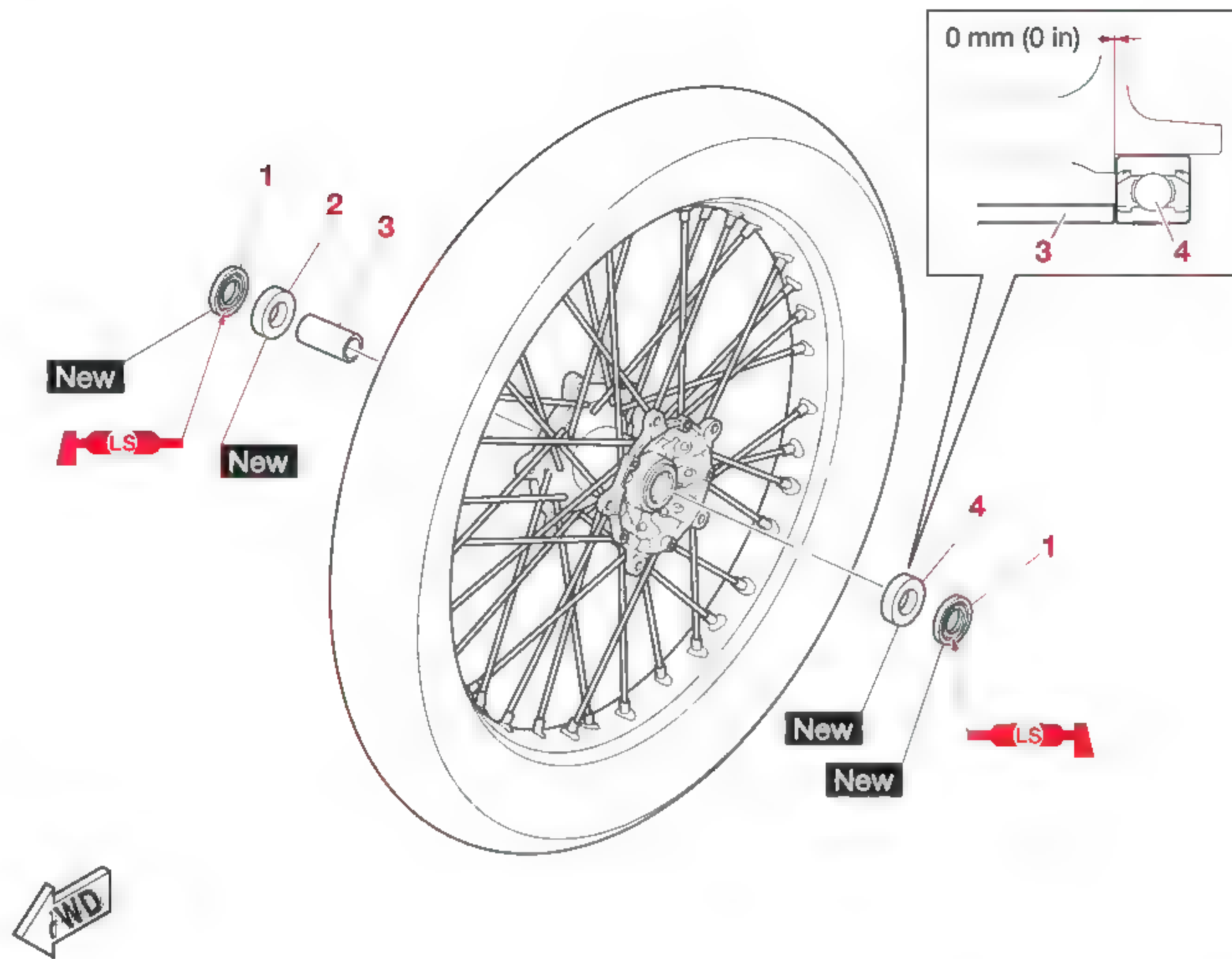
Removing the front wheel and brake discs



Order	Job/Parts to remove	Q'ty	Remarks
1	Reflector bracket	2	
2	Reflector	2	
3	Front brake caliper	2	
4	Front fender	1	
5	Front fork protector	2	
6	Front wheel sensor lead holder	1	
7	Front wheel sensor protector	1	
8	Front wheel sensor	1	
9	Front wheel axle pinch bolt	2	Loosen.
10	Front wheel axle	1	
11	Front wheel	1	
12	Collar	2	
13	Front brake disc	2	
14	Front wheel sensor rotor	1	

FRONT WHEEL

Disassembling the front wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	2	
2	Wheel bearing (right)	1	
3	Spacer	1	
4	Wheel bearing (left)	1	

EAS30145

REMOVING THE FRONT WHEEL

ECA20981

NOTICE

- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel sensor or front wheel sensor rotor; otherwise, the sensor or rotor may be damaged, resulting in improper performance of the ABS system.
- Do not drop the front wheel sensor rotor or subject it to shocks.
- If any solvent gets on the front wheel sensor rotor, wipe it off immediately.

1. Stand the vehicle on a level surface.

EWA13120

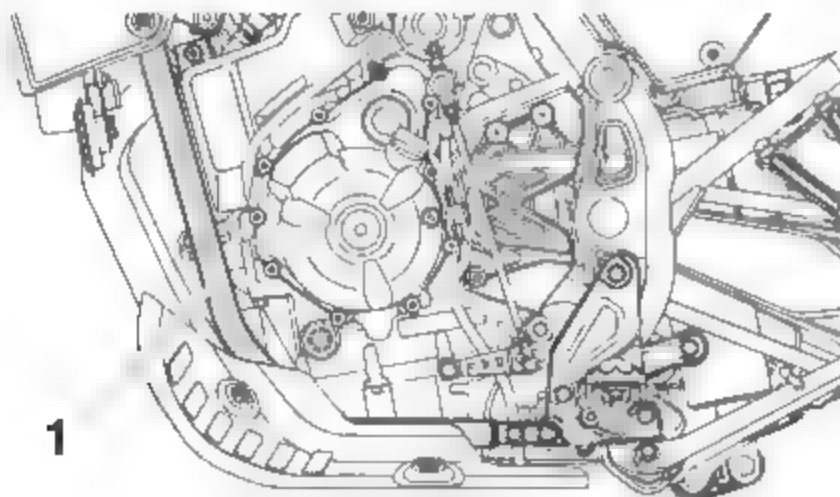
WARNING

Securely support the vehicle so that there is no danger of it falling over.

ECA27170

NOTICE

Down tubes "1" are not designed to lift the vehicle. Do not lift the vehicle with a jack-up stand by putting it under the down tubes.



2. Remove:
 - Front brake calipers
 - Front wheel sensor

ECA20990

NOTICE

- Do not apply the brake lever when removing the brake calipers.
- Be sure not to contact the sensor electrode to any metal part when removing the front wheel sensor from the outer tube.

3. Elevate:
 - Front wheel

TIP

Place the vehicle on a suitable stand so that the front wheel is elevated.

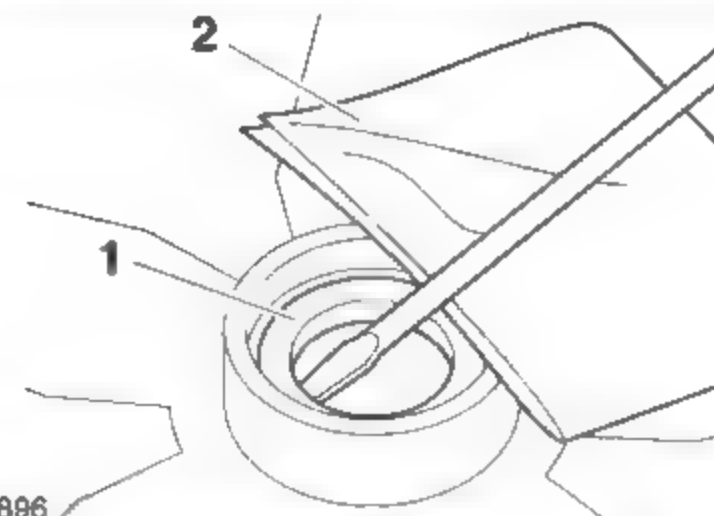
EAS30146

DISASSEMBLING THE FRONT WHEEL

1. Remove:
 - Oil seal
 - Wheel bearings
 - a. Clean the surface of the front wheel hub.
 - b. Remove the oil seals "1" with a flat-head screwdriver.

TIP

To prevent damaging the wheel, place a rag "2" between the screwdriver and the wheel surface.



G088896

- c. Remove the wheel bearings with a general bearing puller.

EAS30147

CHECKING THE FRONT WHEEL

1. Check:
 - Front wheel axle
 - Roll the wheel axle on a flat surface.
 - Bends → Replace.

EWA13120

WARNING

Do not attempt to straighten a bent wheel axle.

2. Check:
 - Tire
 - Front wheel
 - Damage/wear → Replace.

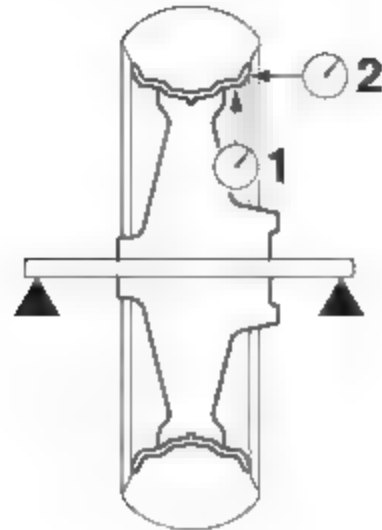
Refer to "CHECKING THE TIRES" on page 3-17 and "CHECKING THE WHEELS" on page 3-17.
3. Check:
 - Spokes
 - Bends/damage → Replace.
 - Loose → Tighten.

Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-17.
4. Measure:
 - Radial wheel runout "1"
 - Lateral wheel runout "2"

Over the specified limits → Replace.



Radial wheel runout limit
2.0 mm (0.08 in)
Lateral wheel runout limit
2.0 mm (0.08 in)



G088897

5. Check:

- Wheel bearings
Front wheel turns roughly or is loose → Replace the wheel bearings.
- Oil seals
Damage/wear → Replace.

MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

ECA21070

NOTICE

- Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.
- The front wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.
- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel sensor or front wheel sensor rotor.
- Do not drop or shock the wheel sensor or the wheel sensor rotor.

1. Check:

- Front wheel sensor
Cracks/bends/distortion → Replace.
Iron powder/dust → Clean.

2. Check:

- Front wheel sensor rotor
Cracks/damage/scratches → Replace the front wheel sensor rotor.
Iron powder/dust/solvent → Clean.

TIP

- The wheel sensor rotor is installed on the inner side of the wheel hub.

- When cleaning the wheel sensor rotor, be careful not to damage the surface of the sensor rotor.

3. Measure:

- Wheel sensor rotor deflection
Out of specification → Clean the installation surface of the wheel sensor rotor and correct the wheel sensor rotor deflection, or replace the wheel sensor rotor.

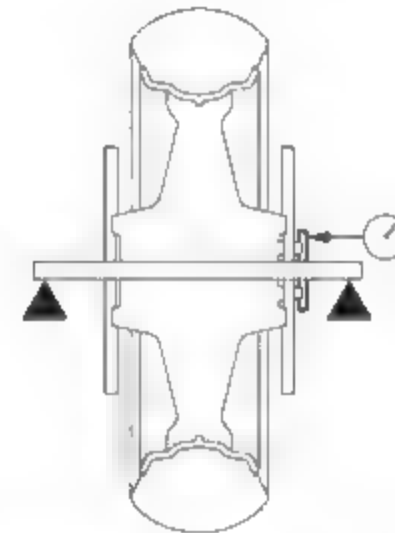


Wheel sensor rotor deflection limit
0.25 mm (0.0098 in)

- Hold the dial gauge at a right angle against the wheel sensor rotor surface.
- Measure the wheel sensor rotor deflection.

TIP

Do not touch the surface of the wheel sensor rotor with a sharp object.



G088902

- If the deflection is above specification, remove the sensor rotor from the wheel, rotate it by one or two bolt holes, and then install it.



Front wheel sensor rotor bolt
8 N·m (0.8 kgf·m, 5.9 lb·ft)
LOCTITE®

REPLACE THE BOLT

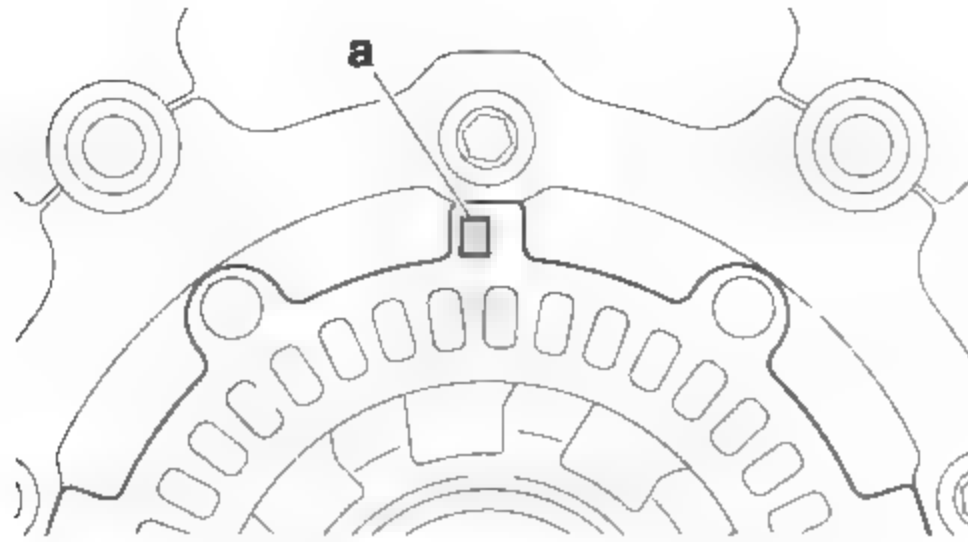
NOTICE

Replace the wheel sensor rotor bolts with new ones.

- If the deflection is still above specification, replace the wheel sensor rotor.

TIP

- Install the wheel sensor rotor with the stamped mark "a" facing outward.
- Tighten the front wheel sensor rotor bolts in stages and in a crisscross pattern.



EAS30151

ASSEMBLING THE FRONT WHEEL

1. Install:

- Wheel bearings **New**
- Oil seals **New**
- a. Install the new wheel bearing (left side).

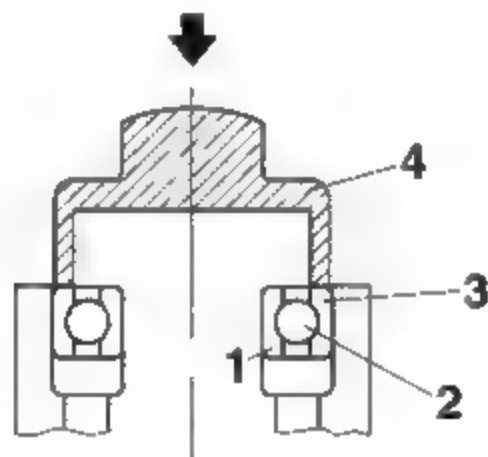
ECA18110

NOTICE

Do not contact the wheel bearing inner race "1" or balls "2". Contact should be made only with the outer race "3".

TIP

Use a socket "4" that matches the diameter of the wheel bearing outer race.

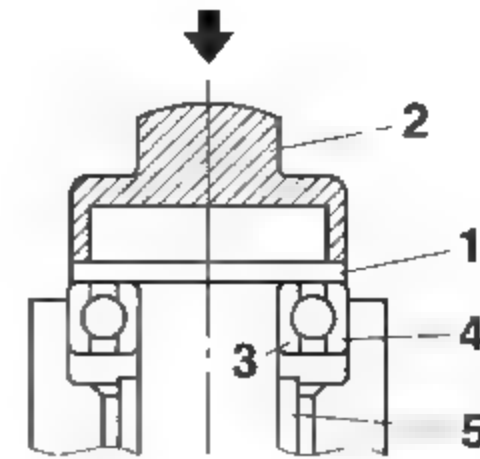


G088898

- b. Install the spacer.
- c. Install the new wheel bearing (right side).

TIP

Place a suitable washer "1" between the socket "2" and the bearing so that both the inner race "3" and outer race "4" are pressed at the same time, and then press the bearing until the inner race makes contact with the spacer "5".



G088899

EAS30152

ADJUSTING THE FRONT WHEEL STATIC BALANCE

TIP

- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake disc installed.

1. Remove:

- Balancing weight(s)

2. Find:

- Front wheel's heavy spot

3. Adjust:

- Front wheel static balance

4. Check:

- Front wheel static balance

EAS32231

INSTALLING THE FRONT WHEEL

1. Install:

- Front wheel sensor rotor
- Front brake discs



Front wheel sensor rotor bolt
8 N·m (0.8 kgf·m, 5.9 lb·ft)

LOCTITE®

Front brake disc bolt
18 N·m (1.8 kgf·m, 13 lb·ft)

LOCTITE®

ECA21011

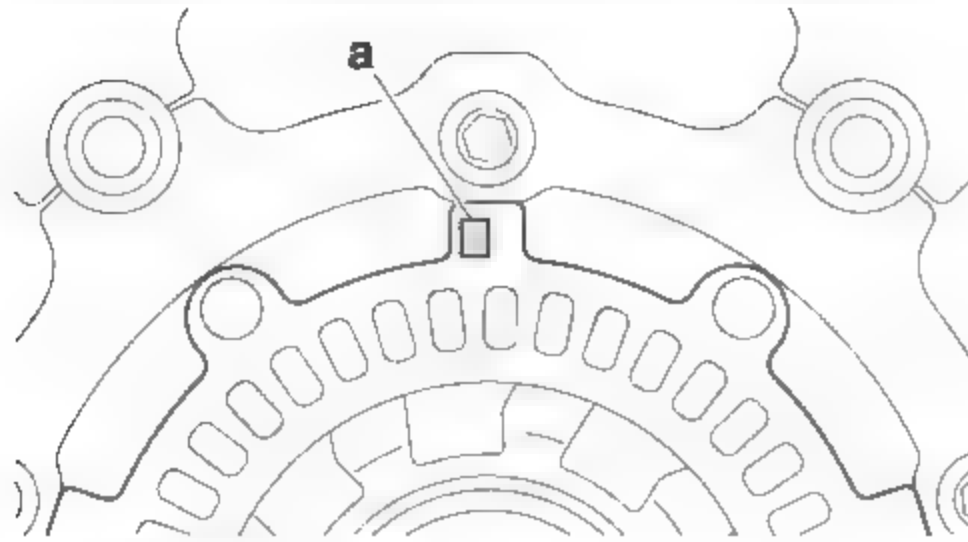
NOTICE

- Do not drop the wheel sensor rotor or subject it to shocks.
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.
- Replace the brake disc bolts and wheel sensor rotor bolts with new ones.

TIP

- Install the wheel sensor rotor with the stamped mark "a" facing outward.


- Tighten the brake disc bolts and wheel sensor rotor bolts in stages and in a crisscross pattern.



2. Lubricate:
 - Oil seal lips

	Recommended lubricant Lithium-soap-based grease
------------------------------------------------------------------------------------	------------------------------------------------------------------

3. Install:
 - Collars
 - Front wheel
 - Front wheel axle
 - Front wheel axle pinch bolts

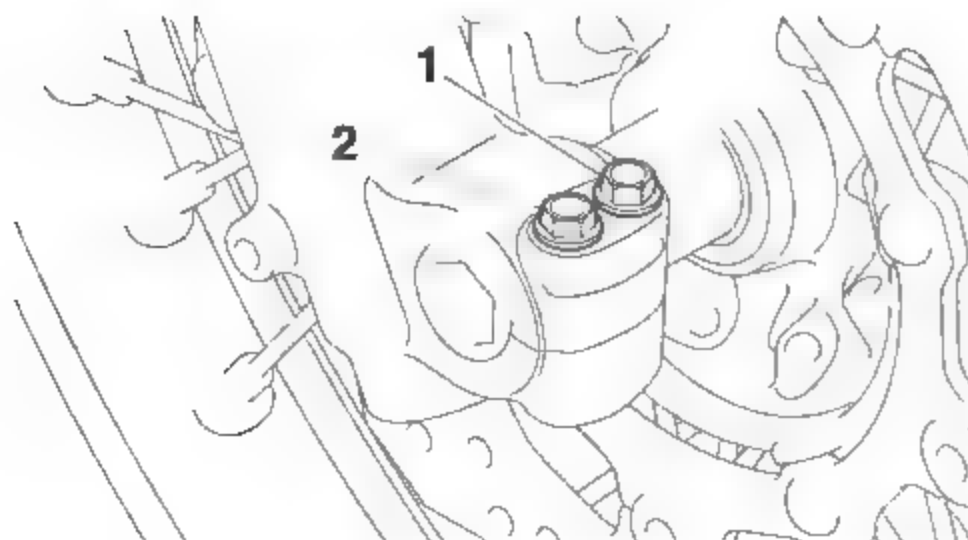
	Front wheel axle 72 N·m (7.2 kgf·m, 53 lb·ft) Front wheel axle pinch bolt 21 N·m (2.1 kgf·m, 15 lb·ft)
-------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------

ECA14140


NOTICE

Before tightening the wheel axle nut, push down hard on the handlebar(s) several times and check if the front fork rebounds smoothly.

- Insert the front wheel axle from the right side and tighten it to specification.
- In the order pinch bolt "1" → pinch bolt "2" → pinch bolt "1", tighten each bolt to specification without performing temporary tightening.



4. Check:
 - Front brake discs
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-31.
5. Install:
 - Front wheel sensor
 - Front wheel sensor protector
 - Front wheel sensor lead holder "1"

	Front wheel sensor bolt 7 N·m (0.7 kgf·m, 5.2 lb·ft) Front wheel sensor lead holder bolt 7 N·m (0.7 kgf·m, 5.2 lb·ft)
-------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------

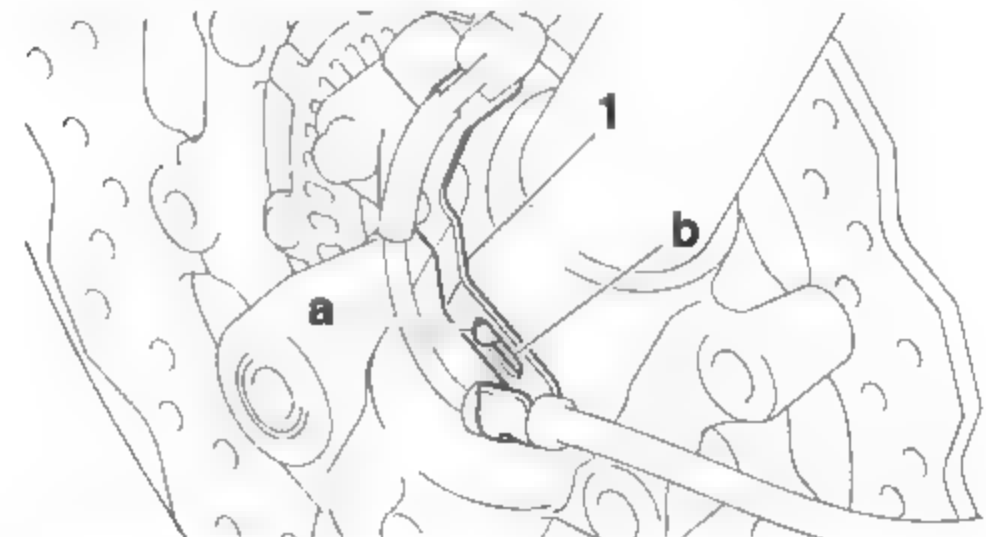
ECA21020

NOTICE

Make sure there are no foreign materials in the front wheel sensor rotor and front wheel sensor. Foreign materials cause damage to the front wheel sensor rotor and front wheel sensor.

TIP

- Fit the projection "a" on the front fork into the hole "b" on the front wheel sensor lead holder.
- When installing the front wheel sensor, check the wheel sensor lead for twists.
- To route the front wheel sensor lead, refer to "CABLE ROUTING" on page 2-13.



6. Measure:
 - Distance "a"
(between the front wheel sensor rotor "1" and front wheel sensor "2")
Out of specification → Check the wheel bearing for looseness, and the front wheel sensor and sensor rotor installation conditions (warpage caused by overtorque, wrong installation direction, rotor decentering, LOCTITE® on the mounting surface of the rotor, deformation caused by an impact during service and caught foreign materials). If there is any defective part, repair or replace the defective part.



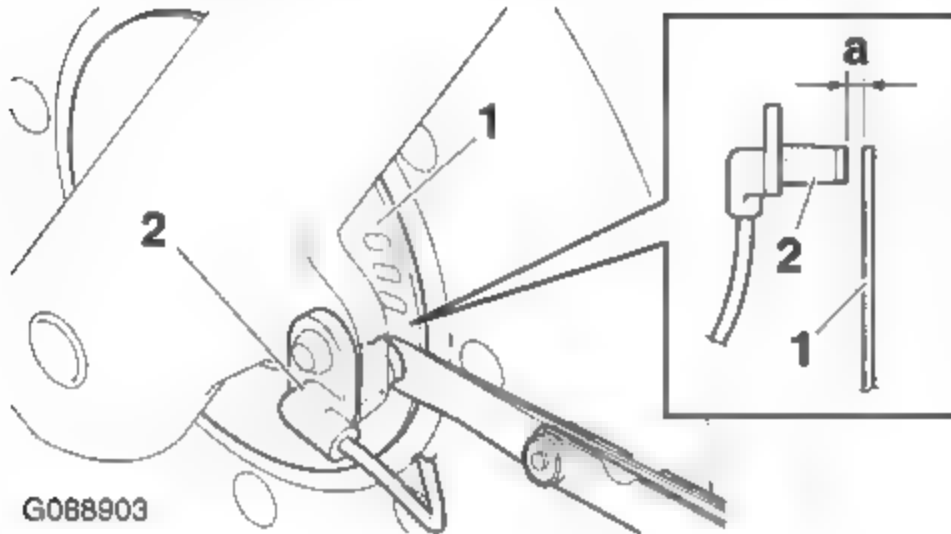
Distance "a" (between the front wheel sensor rotor and front wheel sensor)
0.7–1.6 mm (0.03–0.06 in)

TIP

Measure the distance between the front wheel sensor rotor and front wheel sensor in several places in one rotation of the front wheel. Do not turn the front wheel while the thickness gauge is installed. This may damage the front wheel sensor rotor and the front wheel sensor.



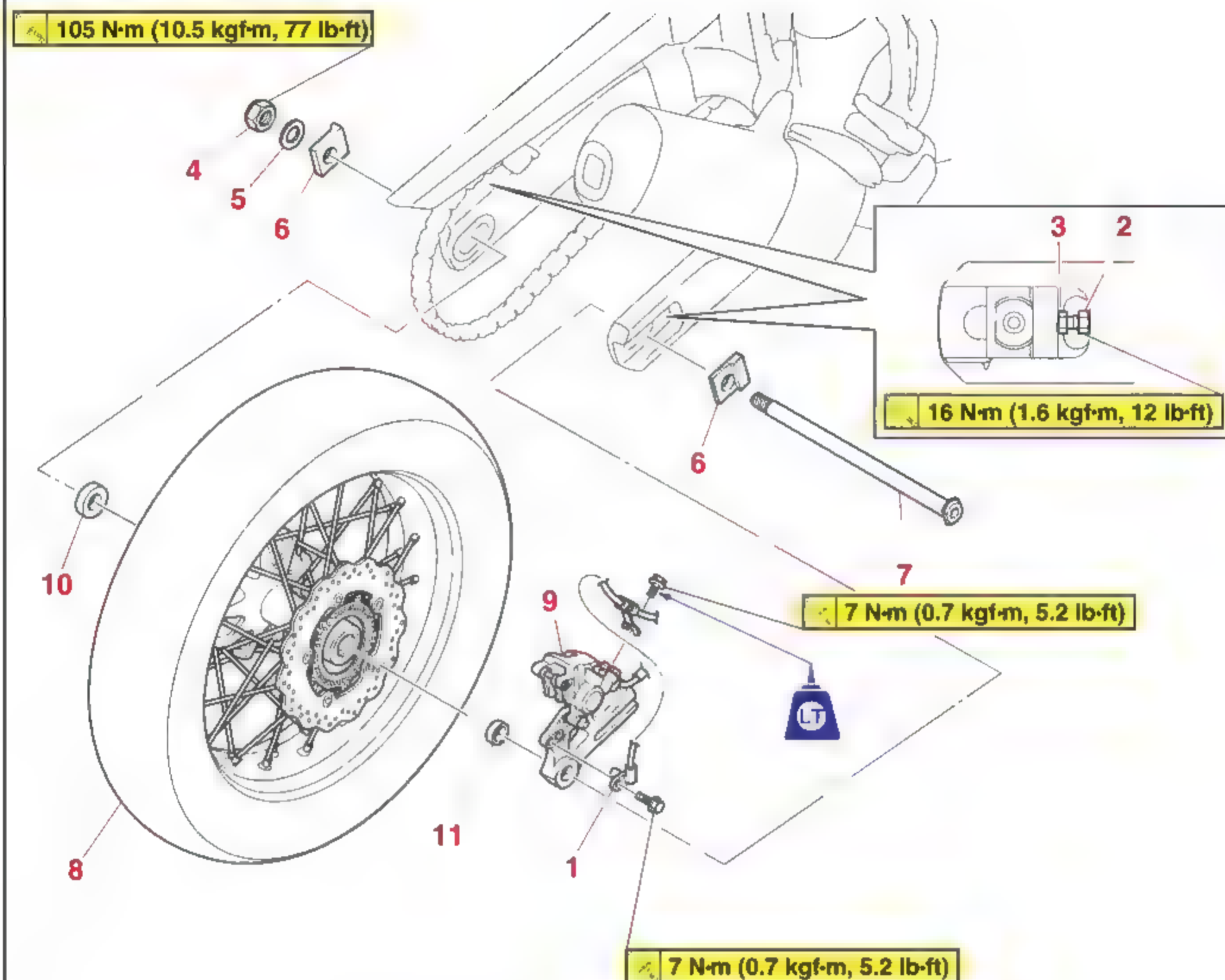
Thickness gauge
90890-03268
Feeler gauge set
YU-26900-9



EAS20029

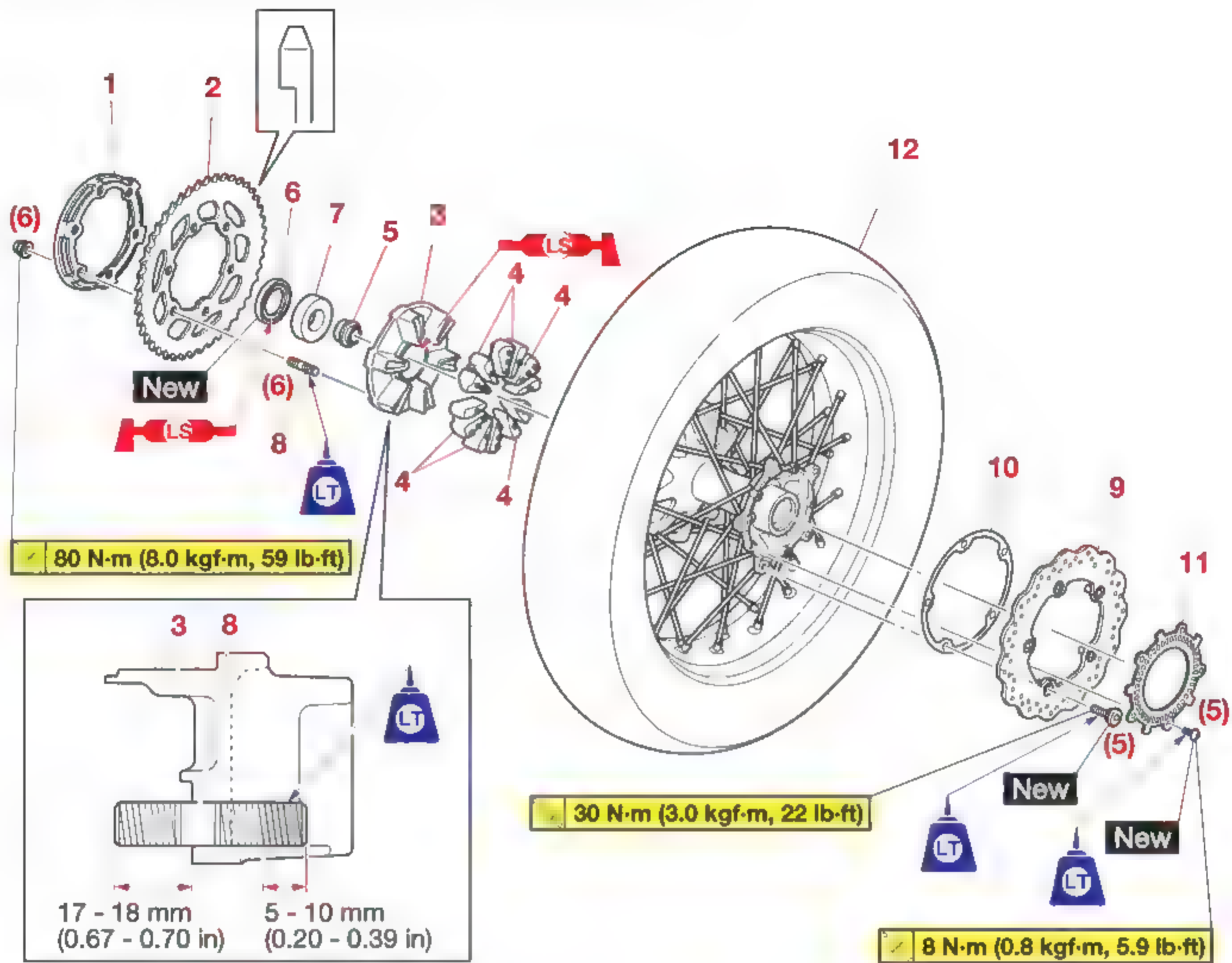
REAR WHEEL

Removing the rear wheel



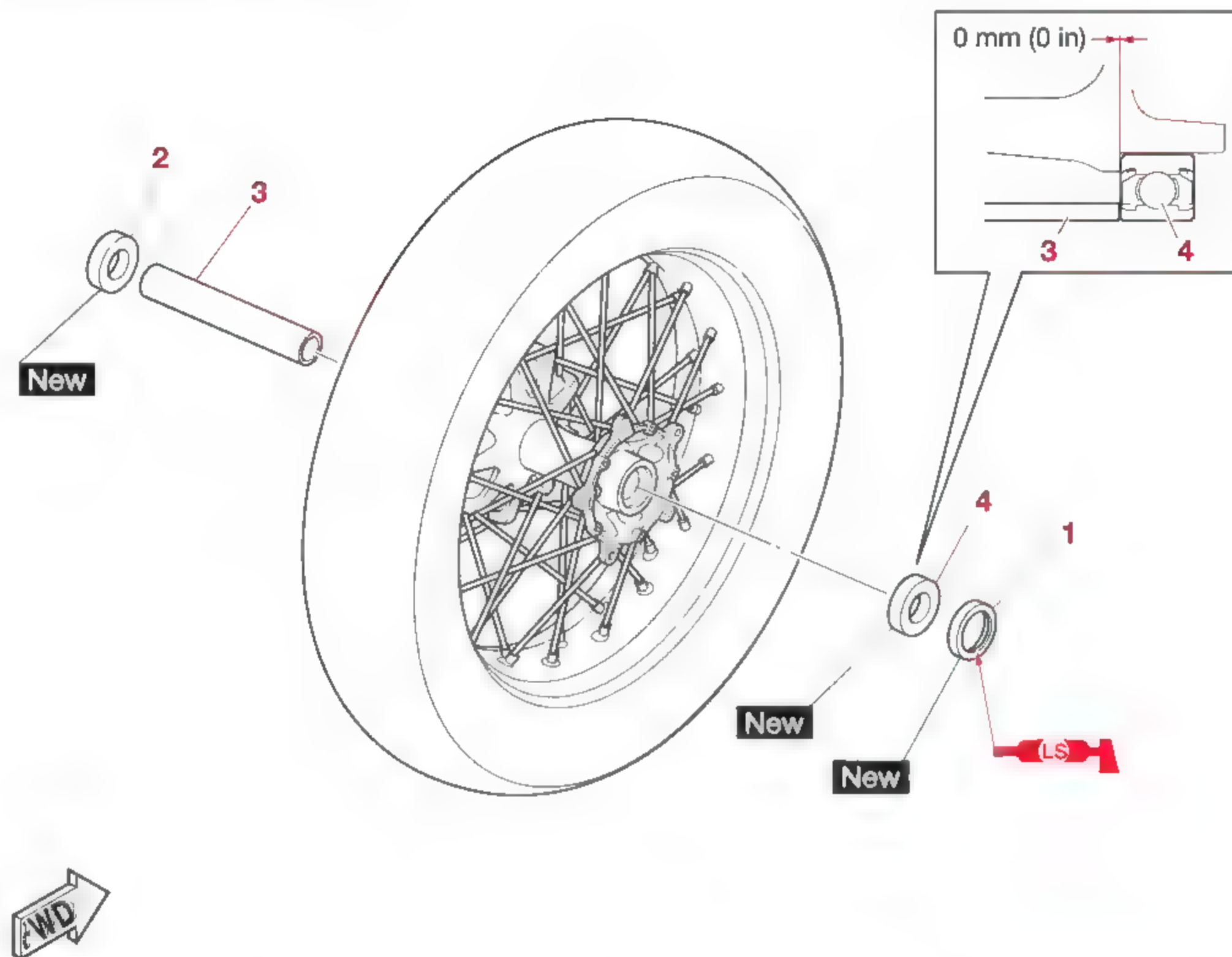
Order	Job/Parts to remove	Q'ty	Remarks
1	Rear wheel sensor	1	
2	Locknut	2	Loosen.
3	Adjusting bolt	2	Loosen.
4	Rear wheel axle nut	1	
5	Washer	1	
6	Adjusting block	2	
7	Rear wheel axle	1	
8	Rear wheel	1	
9	Rear brake caliper	1	
10	Collar (left)	1	
11	Collar (right)	1	

Removing the rear brake disc and rear wheel sprocket



Order	Job/Parts to remove	Q'ty	Remarks
1	Bracket	1	
2	Rear wheel sprocket	1	
3	Rear wheel drive hub	1	
4	Rear wheel drive hub damper	6	
5	Collar	1	
6	Oil seal	1	
7	Bearing	1	
8	Rear wheel sprocket stud bolt	6	
9	Rear brake disc	1	
10	Rear brake disc plate	1	
11	Rear wheel sensor rotor	1	
12	Rear wheel	1	

Disassembling the rear wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	1	
2	Wheel bearing (left)	1	
3	Spacer	1	
4	Wheel bearing (right)	1	

EAS30810

REMOVING THE REAR WHEEL

ECA21030

NOTICE

- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the rear wheel sensor or rear wheel sensor rotor; otherwise, the sensor or rotor may be damaged, resulting in improper performance of the ABS system.
- Do not drop the rear wheel sensor rotor or subject it to shocks.
- If any solvent gets on the rear wheel sensor rotor, wipe it off immediately.

1. Stand the vehicle on a level surface.

EWA13120

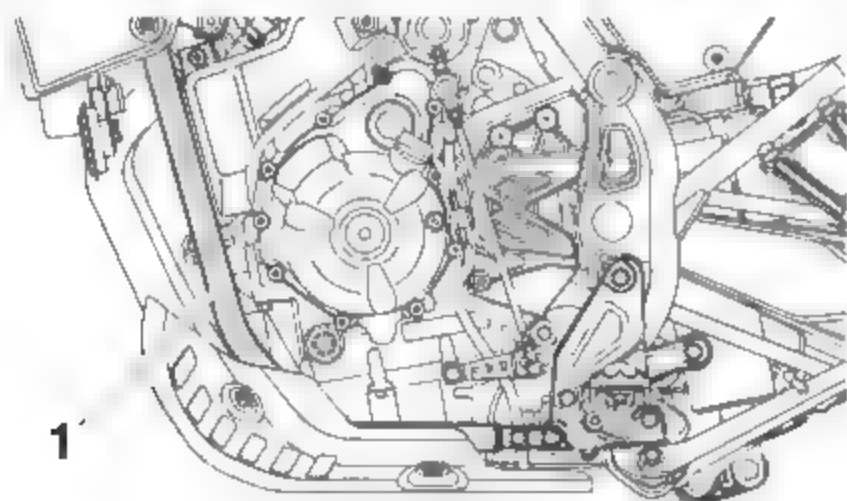
WARNING

Securely support the vehicle so that there is no danger of it falling over.

ECA27170

NOTICE

Down tubes "1" are not designed to lift the vehicle. Do not lift the vehicle with a jack-up stand by putting it under the down tubes.



2. Remove:
 - Rear wheel sensor
 - Rear brake caliper

ECA21040

NOTICE

- Do not depress the brake pedal when removing the brake caliper.
- Be sure not to contact the sensor electrode to any metal part when removing the rear wheel sensor from the rear brake caliper bracket.

3. Loosen:
 - Locknuts
 - Adjusting bolts
4. Remove:
 - Rear wheel axle nut
 - Washer

- Rear wheel axle
- Adjusting blocks
- Rear wheel

TIP

Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.

EAS30158

DISASSEMBLING THE REAR WHEEL

1. Remove:
 - Oil seal
 - Wheel bearings
 Refer to "DISASSEMBLING THE FRONT WHEEL" on page 4-13.

CHECKING THE REAR WHEEL

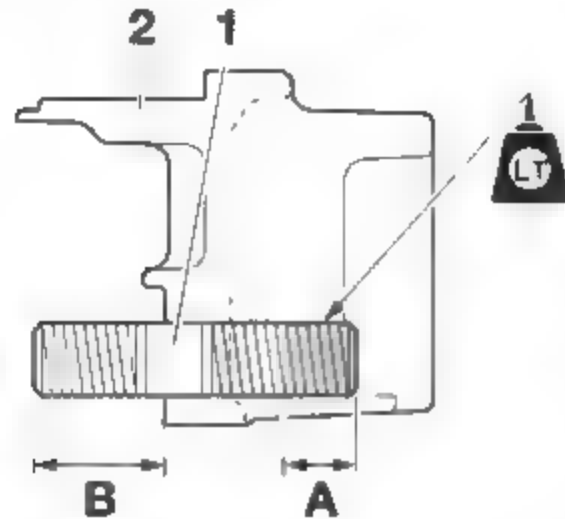
1. Check:
 - Rear wheel axle
 - Wheel bearings
 - Oil seal
 Refer to "CHECKING THE FRONT WHEEL" on page 4-13.
2. Check:
 - Tire
 - Rear wheel
 Damage/wear → Replace.
 Refer to "CHECKING THE TIRES" on page 3-17 and "CHECKING THE WHEELS" on page 3-17.
3. Check:
 - Spokes
 Bends/damage → Replace.
 Loose → Tighten.
 Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-17.
4. Measure:
 - Radial wheel runout
 - Lateral wheel runout
 Refer to "CHECKING THE FRONT WHEEL" on page 4-13.

EAS30160

CHECKING THE REAR WHEEL DRIVE HUB

1. Check:
 - Rear wheel drive hub
 Cracks/damage → Replace.
 - Rear wheel drive hub dampers
 Damage/wear → Replace.
 - Rear wheel drive hub stud bolt
 Bend/damage/wear → Replace.
2. Replace:
 - Rear wheel drive hub stud bolt "1"

- Remove the rear wheel drive hub stud bolt.
- Clean the threaded hole on the rear wheel drive hub "2".
- Apply LOCTITE® to the stud bolt to the area "A" in the illustration.
- Tighten the stud bolt until the specified length "B" in the illustration is obtained.



- A. 5–10 mm (0.20–0.39 in)
B. 17–18 mm (0.67–0.70 in)

TIP

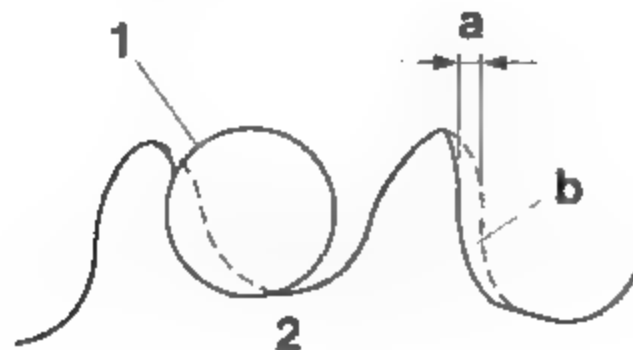
When replaced the rear wheel hub stud bolts, tighten the rear wheel sprocket nuts approximately within 1 hour after stud bolts are tightened.

EAS30161

CHECKING AND REPLACING THE REAR WHEEL SPROCKET

1. Check:

- Rear wheel sprocket
More than 1/4 tooth "a" wear → Replace the drive sprockets as a set.
Bent teeth → Replace the drive sprockets as a set.



G088904

- b. Correct
- Drive chain roller
 - Rear wheel sprocket

2. Replace:

- Rear wheel sprocket
 - Remove the rear wheel sprocket nuts, bracket, and the rear wheel sprocket.

- Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
- Install a new rear wheel sprocket.



Rear wheel sprocket nut
80 N·m (8.0 kgf·m, 59 lb·ft)

TIP

- Install the rear wheel sprocket so that the stepped side of the sprocket faces away from the hub.
- Tighten the rear wheel sprocket nuts in stages and in a crisscross pattern.

EAS30167

MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR

ECA21080

NOTICE

- Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.
- The rear wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.
- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the rear wheel sensor or rear wheel sensor rotor.
- Do not drop or shock the wheel sensor or the wheel sensor rotor.

1. Check:

- Rear wheel sensor
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

2. Check:

- Rear wheel sensor rotor
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

3. Measure:

- Wheel sensor rotor deflection
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.



Wheel sensor rotor deflection limit
0.25 mm (0.0098 in)

EAS30163

ASSEMBLING THE REAR WHEEL

1. Install:

- Wheel bearings **New**
- Oil seals **New**
- a. Install the new wheel bearing (right side).

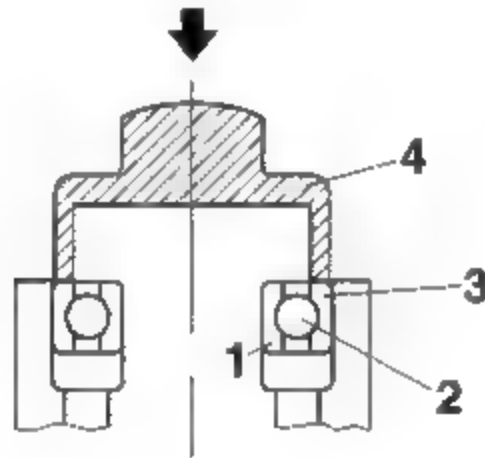
ECA18110

NOTICE

Do not contact the wheel bearing inner race "1" or balls "2". Contact should be made only with the outer race "3".

TIP

Use a socket "4" that matches the diameter of the wheel bearing outer race.

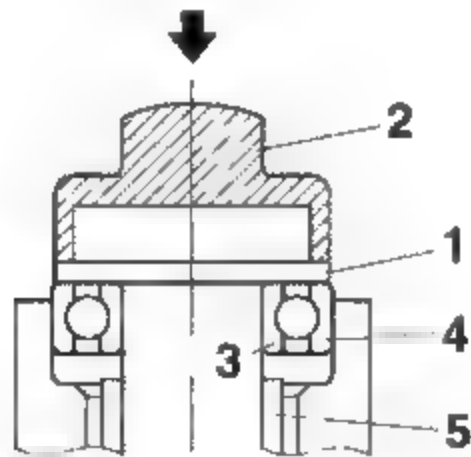


G088898

- b. Install the spacer.
- c. Install the new wheel bearing (left side).

TIP

Place a suitable washer "1" between the socket "2" and the bearing so that both the inner race "3" and outer race "4" are pressed at the same time, and then press the bearing until the inner race makes contact with the spacer "5".



G088899

EAS30164

ADJUSTING THE REAR WHEEL STATIC BALANCE

TIP

- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.

1. Adjust:

- Rear wheel static balance
- Refer to "ADJUSTING THE FRONT WHEEL STATIC BALANCE" on page 4-15.

EAS32063

INSTALLING THE REAR WHEEL

1. Install:

- Rear wheel sensor rotor
- Rear brake disc



Rear wheel sensor rotor bolt
8 N·m (0.8 kgf·m, 5.9 lb·ft)
LOCTITE®
Rear brake disc bolt
30 N·m (3.0 kgf·m, 22 lb·ft)
LOCTITE®

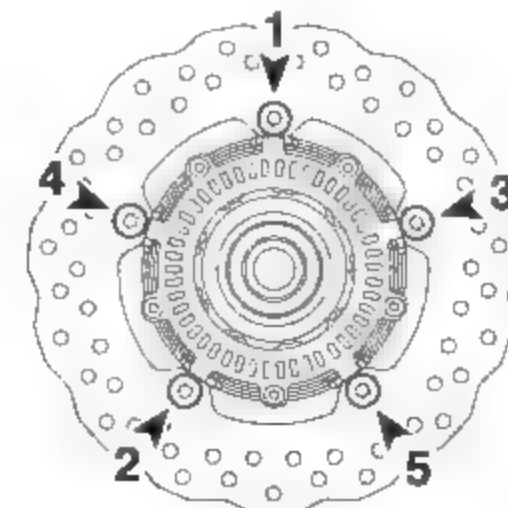
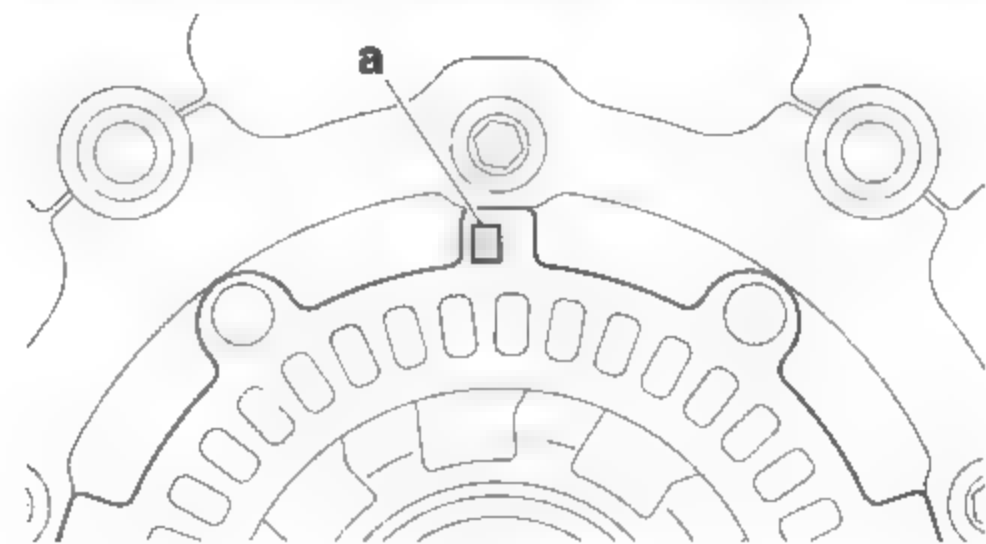
ECA21011

NOTICE

- Do not drop the wheel sensor rotor or subject it to shocks.
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.
- Replace the brake disc bolts and wheel sensor rotor bolts with new ones.

TIP

- Install the wheel sensor rotor with the stamped mark "a" facing outward.
- Tighten the brake disc bolts and wheel sensor rotor bolts in stages and in a crisscross pattern.
- Tighten the rear brake disc bolt as illustration.



2. Install:

- Rear wheel sprocket
Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-22.

3. Check:

- Rear brake disc
Refer to "CHECKING THE REAR BRAKE DISC" on page 4-44.

4. Lubricate:

- Oil seal lips

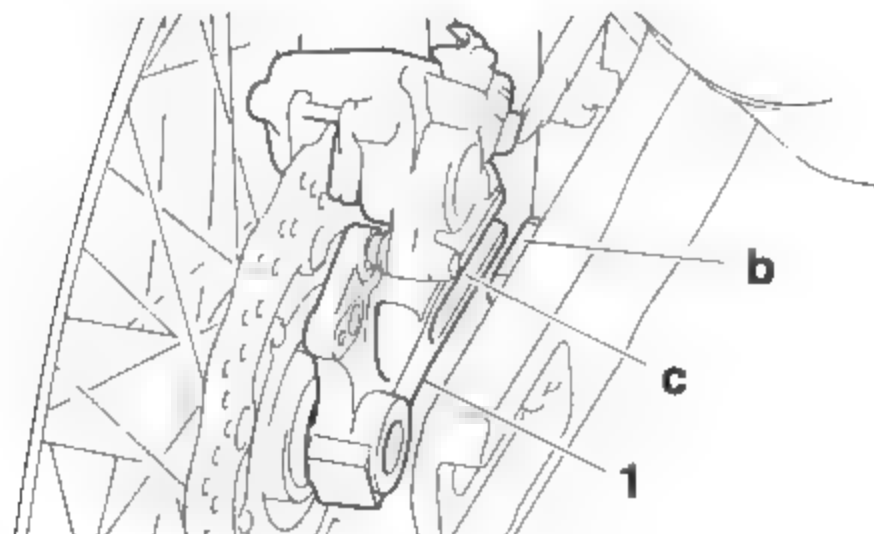
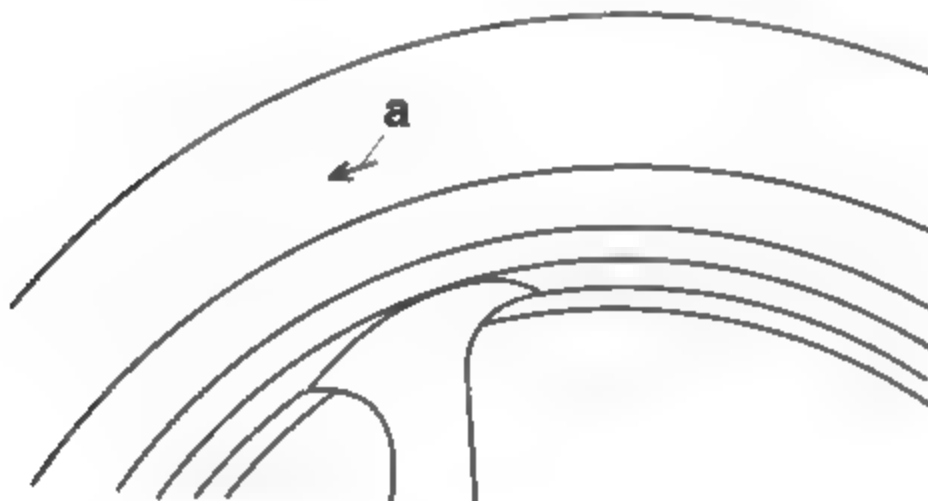


5. Install:

- Collar (right)
- Collar (left)
- Rear brake caliper "1"
- Rear wheel
- Adjusting blocks
- Rear wheel axle
- Washer
- Rear wheel axle nut

TIP

- Install the rear wheel with the mark "a" on the rear tire pointing in the direction of wheel rotation.
- Align the projection "b" in the swingarm with the slot "c" of the brake caliper bracket.



6. Install:

- Rear wheel sensor lead holder "1"

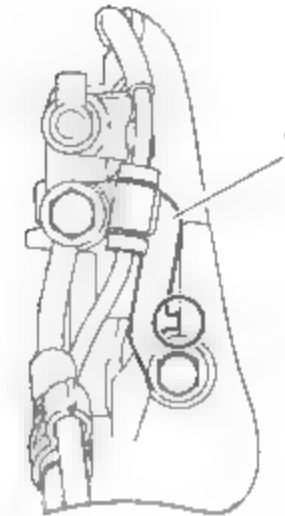
TIP

Contact the rear wheel sensor lead holder to the caliper bracket.

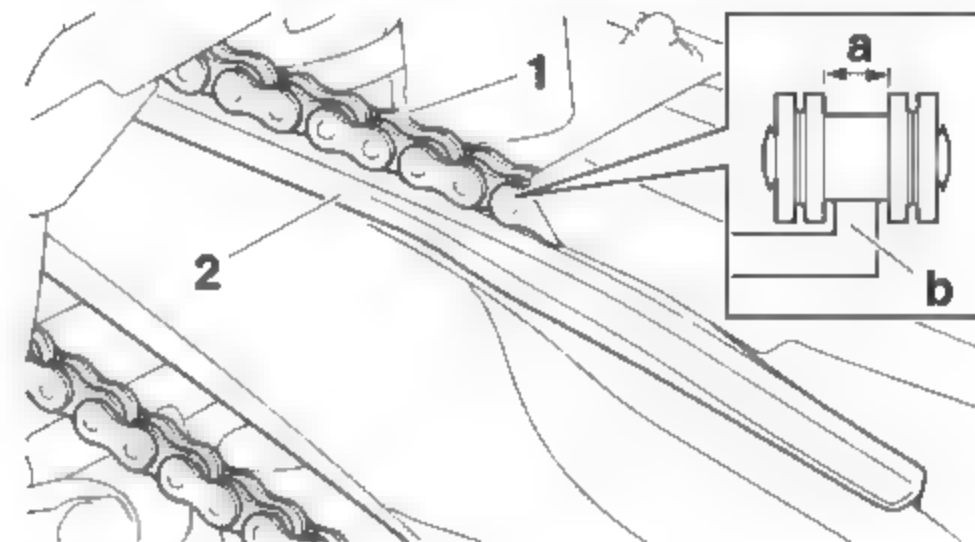


Rear wheel sensor lead holder bolt

7 N·m (0.7 kgf·m, 5.2 lb·ft)



7. Fit the space "a" between the side plates of the drive chain "1" onto the rib "b" on the drive chain guide "2".



8. Adjust:

- Drive chain slack
Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-19.



Drive chain slack (Sidestand)

43.0–48.0 mm (1.69–1.89 in)

Drive chain slack (Maintenance stand)

43.0–48.0 mm (1.69–1.89 in)

Drive chain slack limit

55.0 mm (2.17 in)

9. Install:

- Rear wheel sensor



Rear wheel sensor bolt

7 N·m (0.7 kgf·m, 5.2 lb·ft)

ECA21060

NOTICE

Make sure there are no foreign materials in the rear wheel sensor rotor and rear wheel sensor. Foreign materials cause damage to the rear wheel sensor rotor and rear wheel sensor.

TIP

To route the rear wheel sensor lead, refer to "CABLE ROUTING" on page 2-13.

10.Measure:

- Distance "a"
(between the rear wheel sensor rotor "1" and rear wheel sensor "2")
Out of specification → Check the wheel bearing for looseness, and the rear wheel sensor and sensor rotor installation conditions (warping caused by overtorque, wrong installation direction, rotor decentering, LOCTITE® on the mounting surface of the rotor, deformation caused by an impact during service and caught foreign materials).
If there is any defective part, repair or replace the defective part.



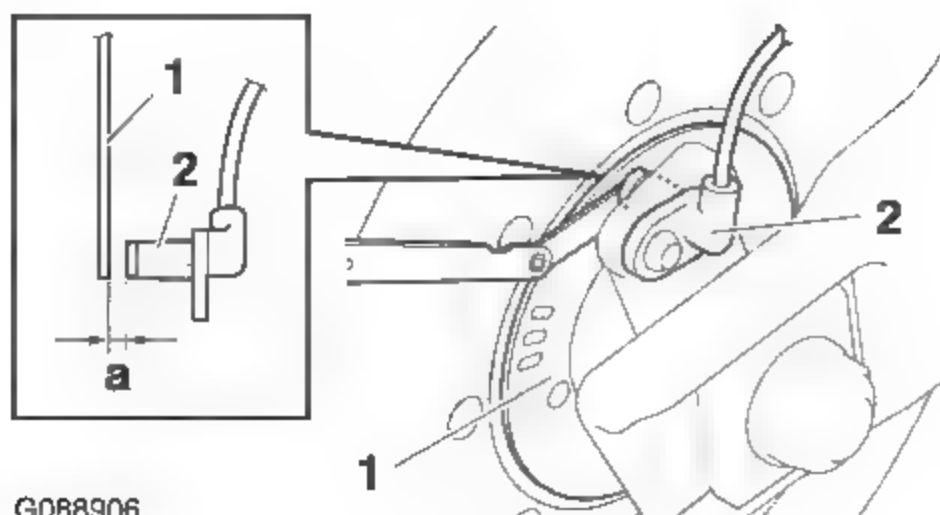
Distance "a" (between the rear wheel sensor rotor and rear wheel sensor)
0.8–1.6 mm (0.03–0.06 in)

TIP

Measure the distance between the rear wheel sensor rotor and rear wheel sensor in several places in one rotation of the rear wheel. Do not turn the rear wheel while the thickness gauge is installed. This may damage the rear wheel sensor rotor and the rear wheel sensor.



Thickness gauge
90890-03268
Feeler gauge set
YU-26900-9

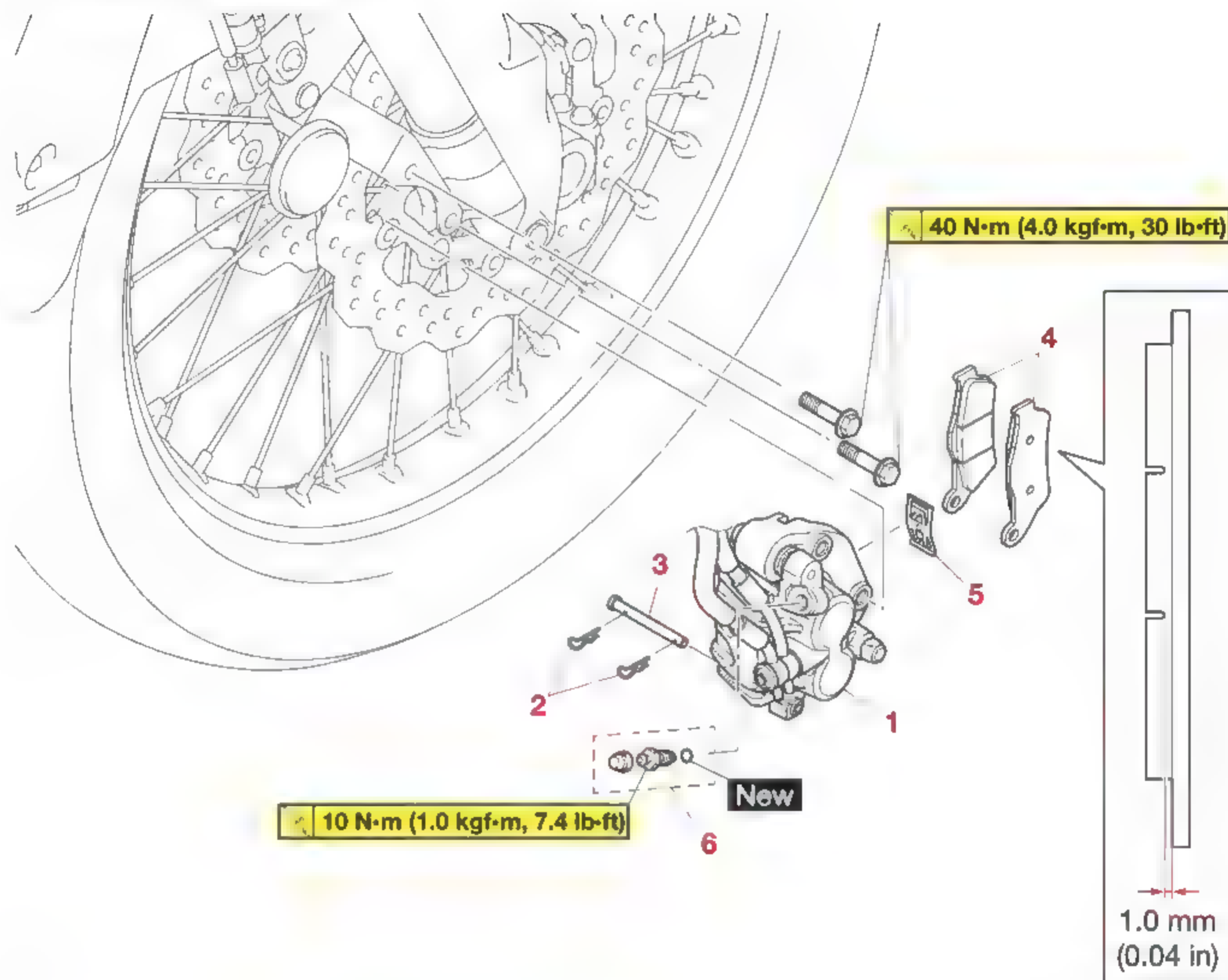


G088906

EAS20030

FRONT BRAKE

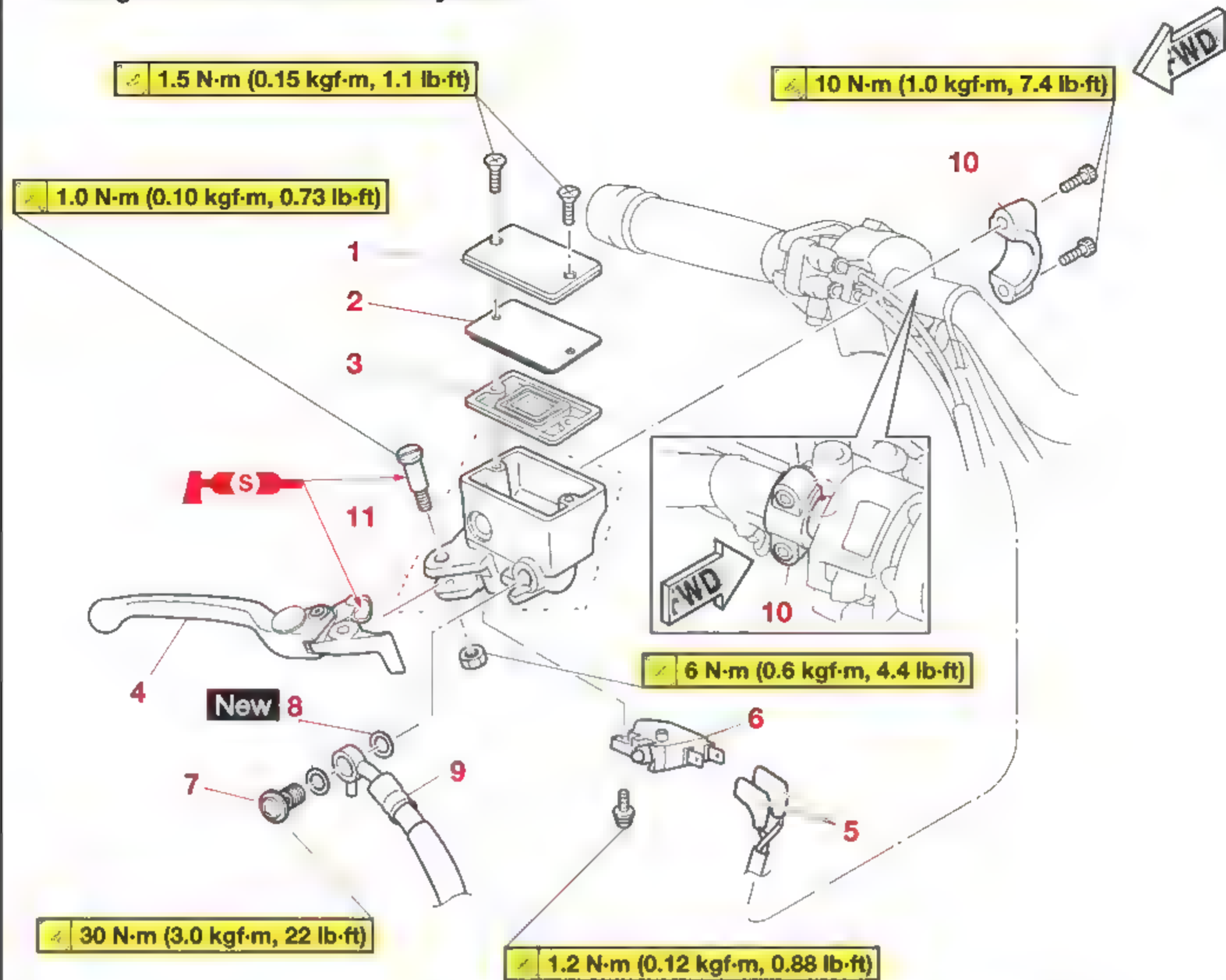
Removing the front brake pads



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Front brake caliper	1	
2	Brake pad clip	2	
3	Brake pad pin	1	
4	Brake pad	2	
5	Brake pad spring	1	
6	Brake caliper bleed screw	1	Loosen.

FRONT BRAKE

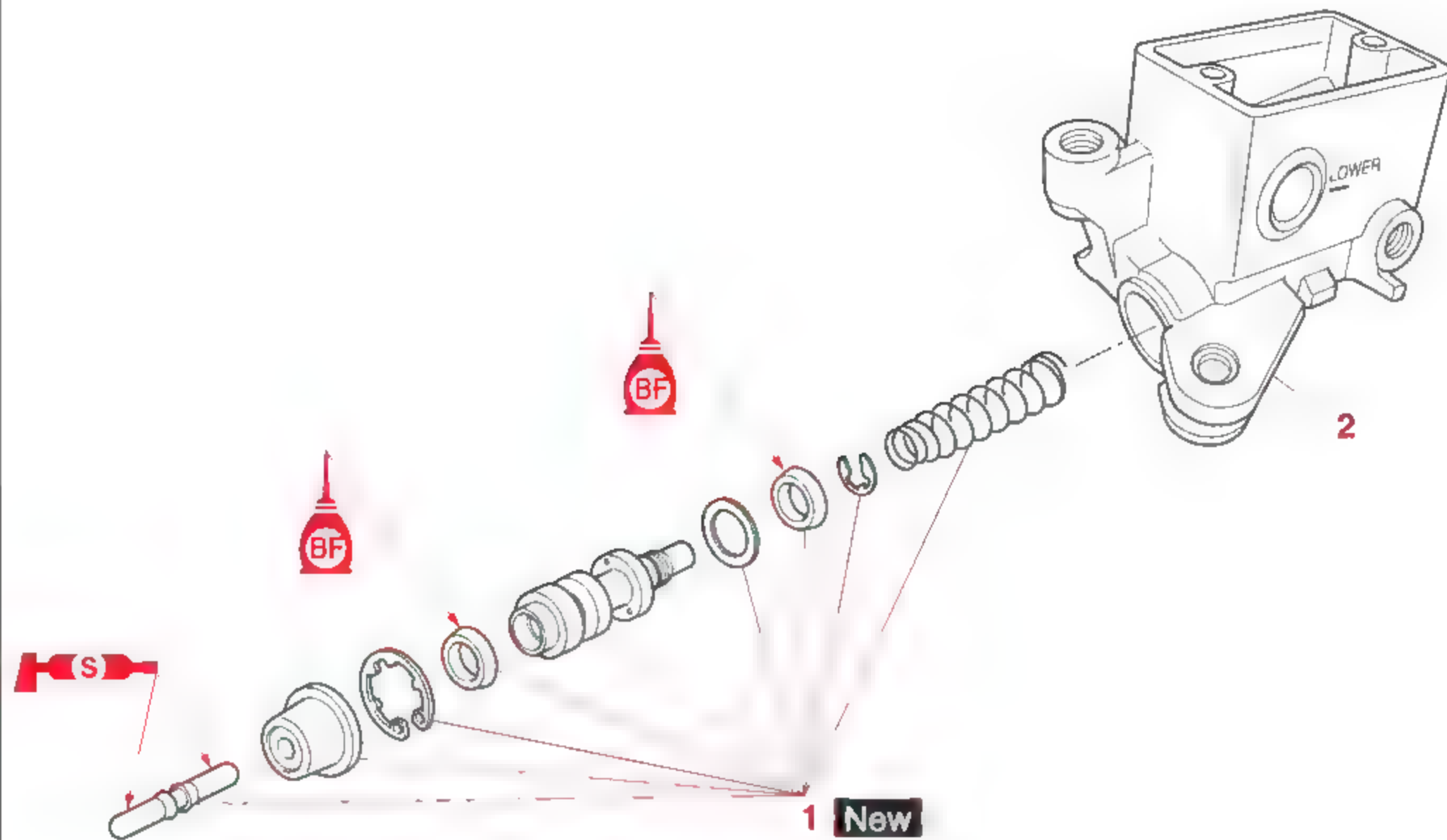
Removing the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
	Rearview mirror (right)		Refer to "HANDLEBAR" on page 4-57.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir diaphragm holder	1	
3	Brake master cylinder reservoir diaphragm	1	
4	Brake lever	1	
5	Front brake light switch connector	2	Disconnect.
6	Front brake light switch	1	
7	Front brake hose union bolt	1	
8	Brake hose gasket	2	
9	Brake hose (front brake master cylinder to hydraulic unit)	1	
10	Front brake master cylinder holder	1	
11	Front brake master cylinder assembly	1	

FRONT BRAKE

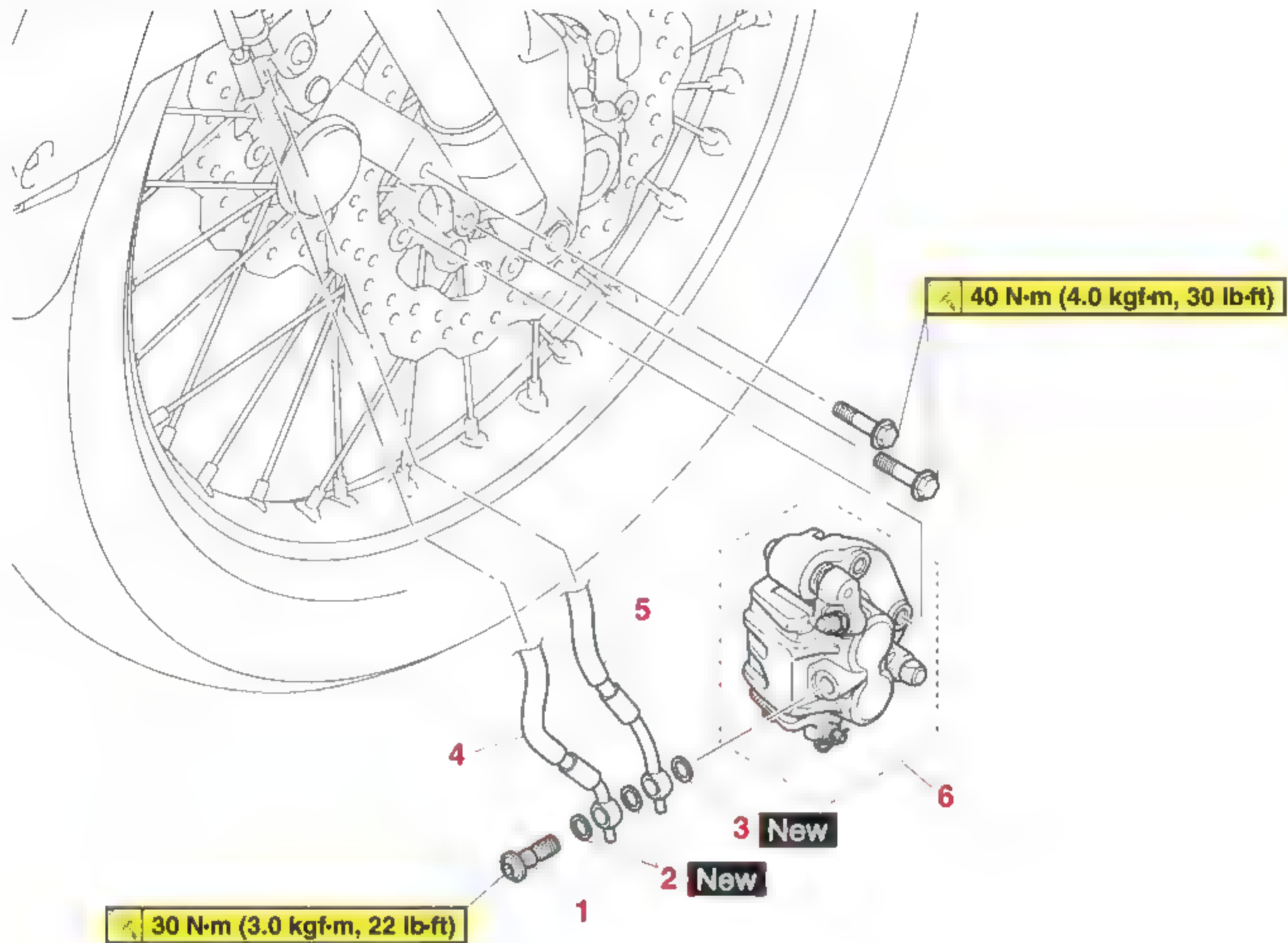
Disassembling the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Brake master cylinder body	1	

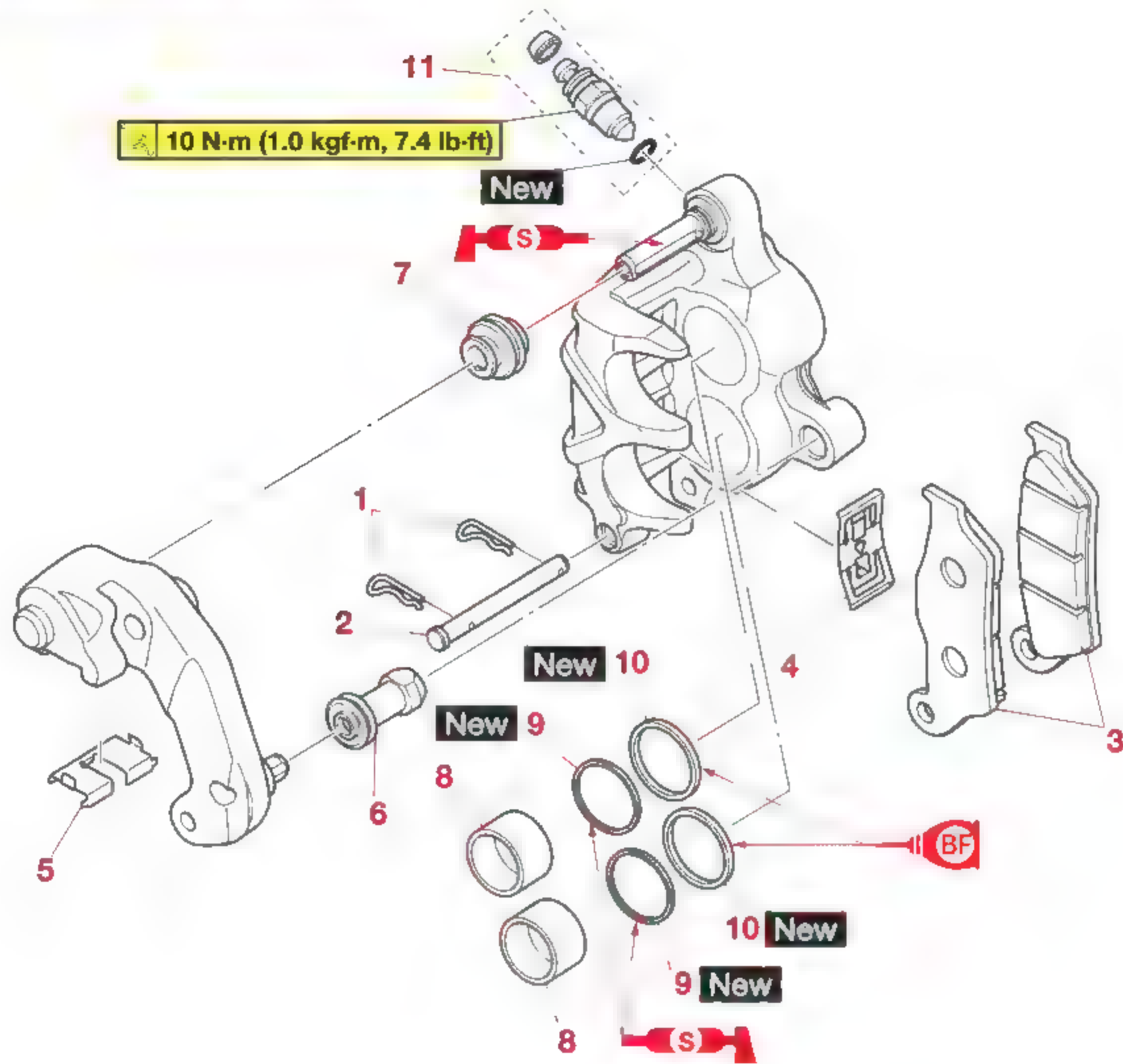
FRONT BRAKE

Removing the front brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
1	Front brake hose union bolt	1	
2	Brake hose gasket	2	
3	Brake hose gasket	1	Right side only.
4	Brake hose (right front brake caliper to left front brake caliper)	1	
5	Brake hose (hydraulic unit to right front brake caliper)	1	Right side only.
6	Front brake caliper	1	

Disassembling the front brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake pad clip	2	
2	Brake pad pin	1	
3	Brake pad	2	
4	Brake pad spring	1	
5	Brake pad support	1	
6	Boot	1	
7	Boot	1	
8	Brake caliper piston	2	
9	Brake caliper piston dust seal	2	
10	Brake caliper piston seal	2	
11	Brake caliper bleed screw	1	

EAS30168

INTRODUCTION

EWA14101

WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Avoid brake fluid coming into contact with the eyes as it can cause serious injury.

FIRST AID FOR BRAKE FLUID ENTERING THE EYES:

- Flush with water for 15 minutes and get immediate medical attention.

EAS30169

CHECKING THE FRONT BRAKE DISCS

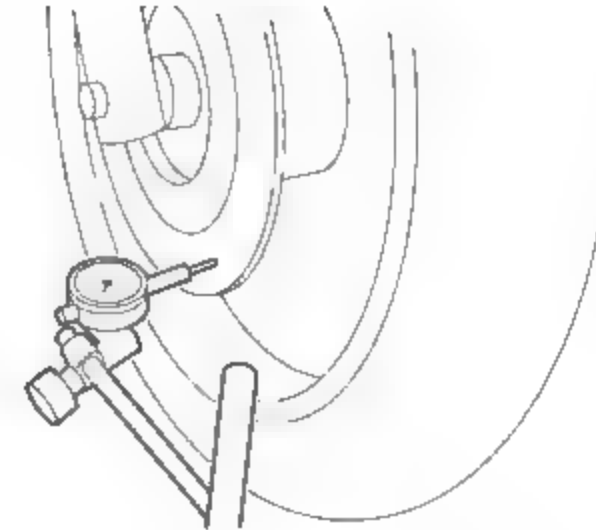
The following procedure applies to both brake discs.

1. Check:
 - Front brake disc
Damage/galling → Replace.
2. Measure:
 - Brake disc deflection
Out of specification → Replace.



Brake disc runout limit (as measured on wheel)
0.15 mm (0.0059 in)

- a. Place the vehicle on a suitable stand so that the front wheel is elevated.
- b. Remove the brake caliper.
- c. Hold the dial gauge at a right angle against the brake disc surface.
- d. Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.



G098641

3. Measure:

- Brake disc thickness
Measure the brake disc thickness at a few different locations.
Out of specification → Replace.



Brake disc thickness limit
4.0 mm (0.16 in)

4. Replace:

- Brake disc
Refer to "FRONT WHEEL" on page 4-11.



Front brake disc bolt
18 N·m (1.8 kgf·m, 13 lb·ft)
LOCTITE®

ECA19150

NOTICE

Replace the brake disc bolts with new ones.

TIP

Tighten the brake disc bolts in stages and in a crisscross pattern.

EAS30170

REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

TIP

When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

1. Measure:

- Brake pad wear "a"
Out of specification → Replace the brake pads as a set.



Brake pad lining thickness limit
1.0 mm (0.04 in)



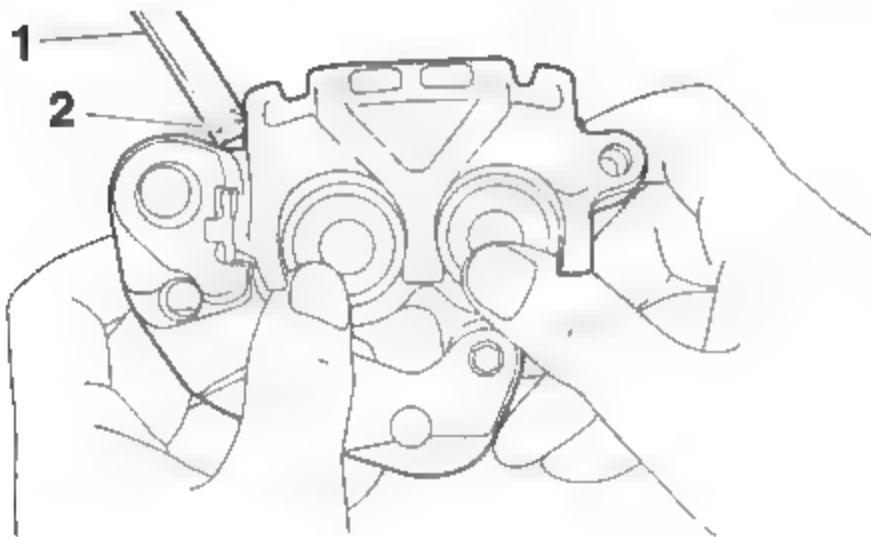
2. Install:

- Brake pad spring
- Brake pads

TIP

Always install new brake pads and a new brake pad spring as a set.

- Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.
- Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your fingers.



- Tighten the bleed screw.

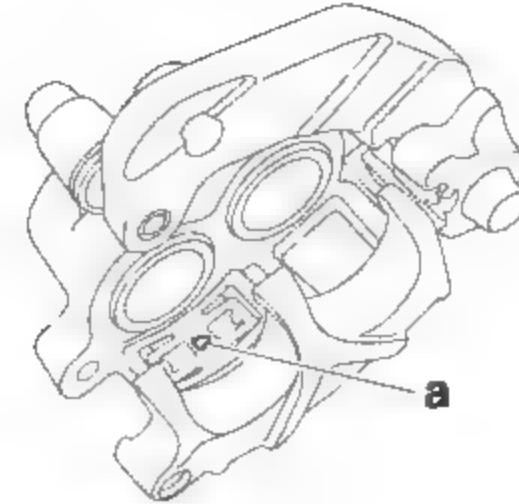


Front brake caliper bleed screw
10 N·m (1.0 kgf·m, 7.4 lb·ft)

- Install the new brake pads and a new brake pad spring.

TIP

- The arrow mark "a" on the brake pad spring must point in the direction of disc rotation.
- Install the brake pad spring in the brake caliper in the recessed portion that is near the brake pad pin.



3. Install:

- Brake pad pin
- Brake pad clips
- Front brake caliper



Front brake caliper bolt
40 N·m (4.0 kgf·m, 30 lb·ft)

4. Check:

- Brake fluid level
Below the minimum level mark → Add the specified brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-16.

5. Check:

- Brake lever operation
Soft or spongy feeling → Bleed the brake system. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

EAS30724

REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

TIP

Before removing the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:

- Brake hose union bolt
- Brake hose gaskets
- Brake hose (hydraulic unit to right front brake caliper) (right side only)
- Brake hose (right front brake caliper to left front brake caliper)

TIP

Put the end of the brake hose into a container and pump out the brake fluid carefully.

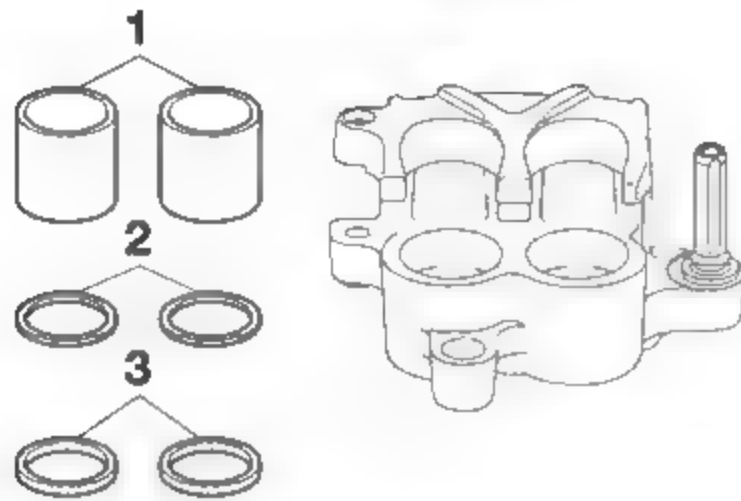
EAS30172

DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Remove:

- Brake caliper pistons "1"
- Brake caliper piston dust seals "2"
- Brake caliper piston seals "3"

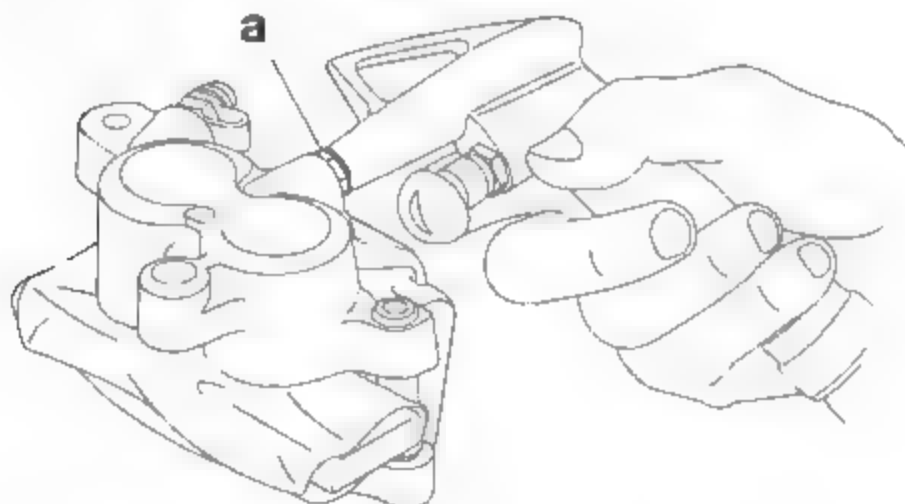


- a. Blow compressed air into the brake hose joint opening "a" to force out the pistons from the brake caliper.

EWA13550

WARNING

- Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake caliper.
- Never try to pry out the brake caliper piston.



- b. Remove the brake caliper piston dust seals and brake caliper piston seals.

EAS30173

CHECKING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seals	Every two years
Piston dust seals	Every two years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

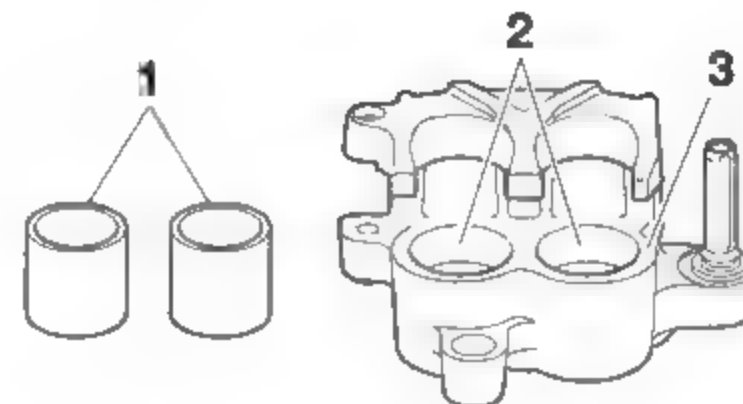
1. Check:

- Brake caliper pistons "1"
Rust/scratches/wear → Replace the brake caliper pistons.
- Brake caliper cylinders "2"
Scratches/wear → Replace the brake caliper assembly.
- Brake caliper body "3"
Cracks/damage → Replace the brake caliper assembly.
- Brake fluid delivery passages (brake caliper body)
Obstruction → Blow out with compressed air.

EWA13611

WARNING

Whenever a brake caliper is disassembled, replace the brake caliper piston dust seals and brake caliper piston seals.



EAS30174

ASSEMBLING THE FRONT BRAKE CALIPERS

EWA13621

WARNING

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.

- Never use solvents on internal brake components as they will cause the brake caliper piston dust seals and brake caliper piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston dust seals and brake caliper piston seals.



**Specified brake fluid
DOT 4**

EAS30175

INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Install:
 - Front brake caliper (temporarily)
 - Brake hose gaskets **New**
 - Brake hose (hydraulic unit to right front brake caliper)
 - Brake hose (right front brake caliper to left front brake caliper)
 - Brake hose union bolt



**Front brake hose union bolt
30 N·m (3.0 kgf·m, 22 lb·ft)**

EWA13531

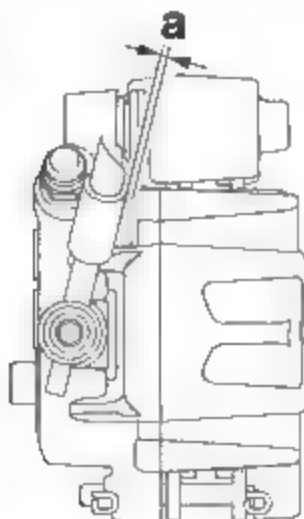
WARNING

Proper brake hose routing is essential to insure safe vehicle operation.

TIP

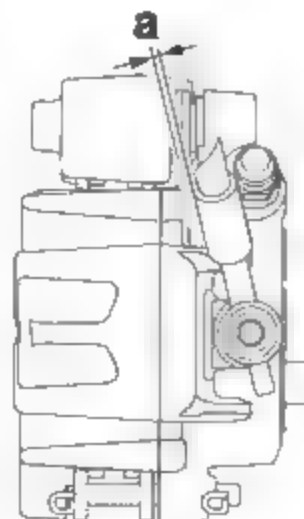
- There should be 1–3 mm (0.04–0.12 in) clearance between the brake pipe and brake caliper as shown in the illustration.
- Align the pins “b” of the brake hose (hydraulic unit to right front brake) and brake hose (right front brake caliper to left front brake caliper).

A



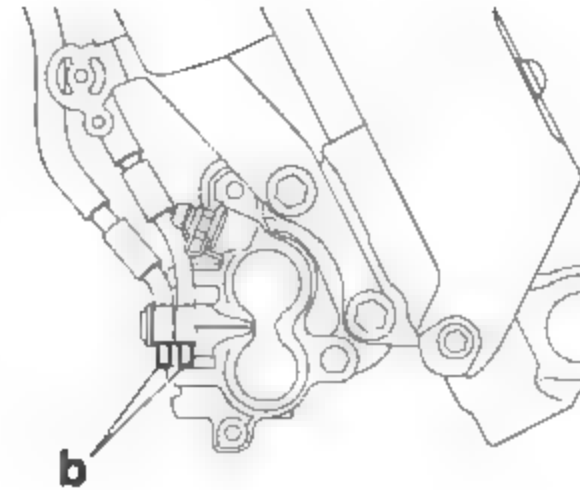
A. Left side

B



B. Right side

a. 1–3 mm (0.04–0.12 in)



2. Remove:
 - Front brake caliper
3. Install:
 - Brake pad spring
 - Brake pads
 - Brake pad pin
 - Brake pad clips

Refer to “REPLACING THE FRONT BRAKE PADS” on page 4-31.
4. Fill:
 - Brake master cylinder reservoir (with the specified amount of the specified brake fluid)



**Specified brake fluid
DOT 4**

EWA13090

WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:
 - Brake system

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-15.

6. Check:
 - Brake fluid level
Below the minimum level mark → Add the specified brake fluid to the proper level.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-16.
7. Check:
 - Brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

EAS30179

REMOVING THE FRONT BRAKE MASTER CYLINDER

TIP

Before removing the front brake master cylinder, drain the brake fluid from the entire brake system.

1. Disconnect:
 - Brake light switch connectors
(from the front brake light switch)
2. Remove:
 - Brake hose union bolt
 - Brake hose gaskets
 - Brake hose (front brake master cylinder to hydraulic unit)

TIP

To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.

EAS30725

CHECKING THE FRONT BRAKE MASTER CYLINDER

1. Check:
 - Brake master cylinder
Damage/scratches/wear → Replace.
 - Brake fluid delivery passages
(brake master cylinder body)
Obstruction → Blow out with compressed air.
2. Check:
 - Brake master cylinder kit
Damage/scratches/wear → Replace.
3. Check:
 - Brake master cylinder reservoir
 - Brake master cylinder reservoir diaphragm holder
Cracks/damage → Replace.
 - Brake master cylinder reservoir diaphragm
Damage/wear → Replace.

4. Check:
 - Brake hose
Cracks/damage/wear → Replace.

ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

WARNING

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.



**Specified brake fluid
DOT 4**

EAS30182

INSTALLING THE FRONT BRAKE MASTER CYLINDER

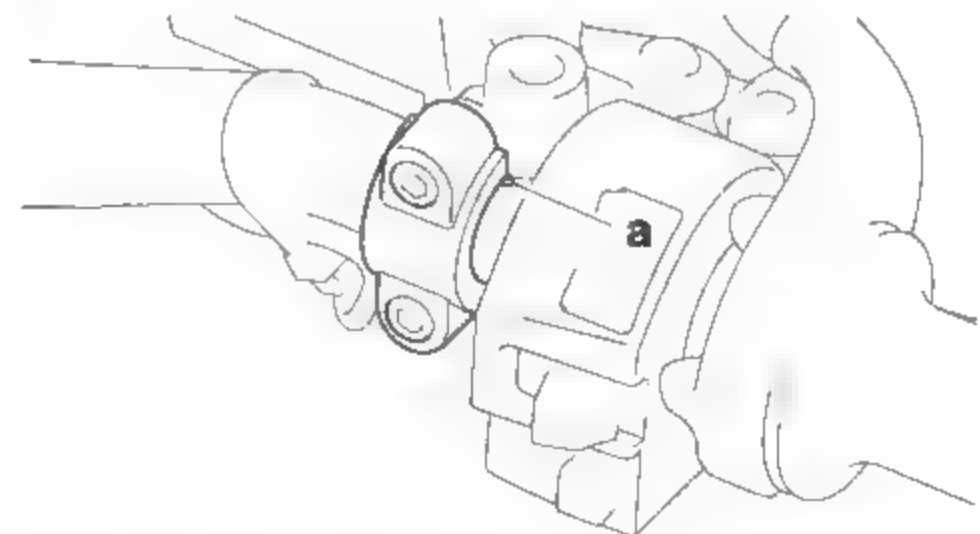
1. Install:
 - Front brake master cylinder assembly
 - Front brake master cylinder holder



**Front brake master cylinder holder bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)**

TIP

Align the end of the front brake master cylinder holder with the punch mark "a" on the handle-bar.



2. Install:
 - Brake hose (front brake master cylinder to hydraulic unit)
 - Brake hose gaskets **New**
 - Brake hose union bolt



**Front brake hose union bolt
30 N·m (3.0 kgf·m, 22 lb·ft)**

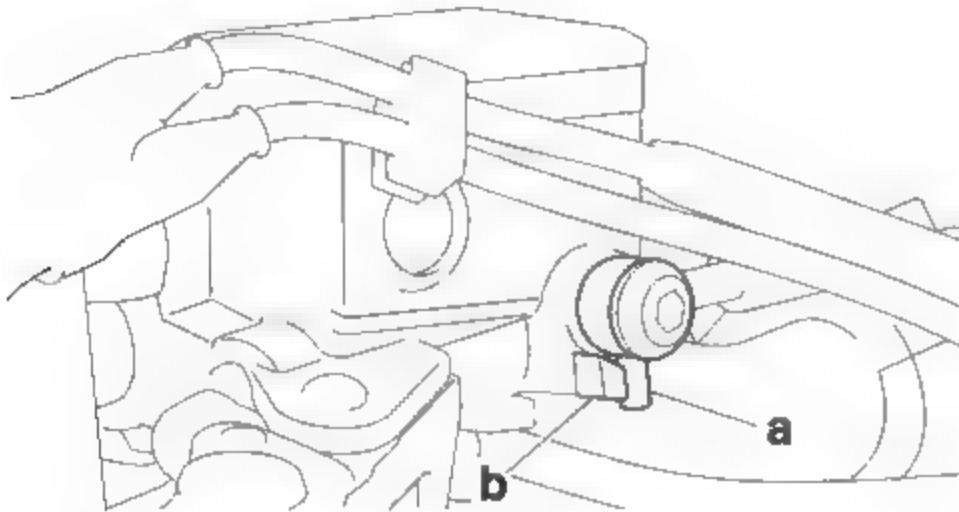
EWA13531

WARNING

Proper brake hose routing is essential to insure safe vehicle operation.

TIP

- Fit the projection “a” on the brake hose to the projection “b” on the front brake master cylinder.
- Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



3. Fill:

- Brake master cylinder reservoir (with the specified amount of the specified brake fluid)



**Specified brake fluid
DOT 4**

EWA13540

WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake master cylinder reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:

- Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-15.

5. Check:

- Brake fluid level
Below the minimum level mark → Add the specified brake fluid to the proper level.
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-16.

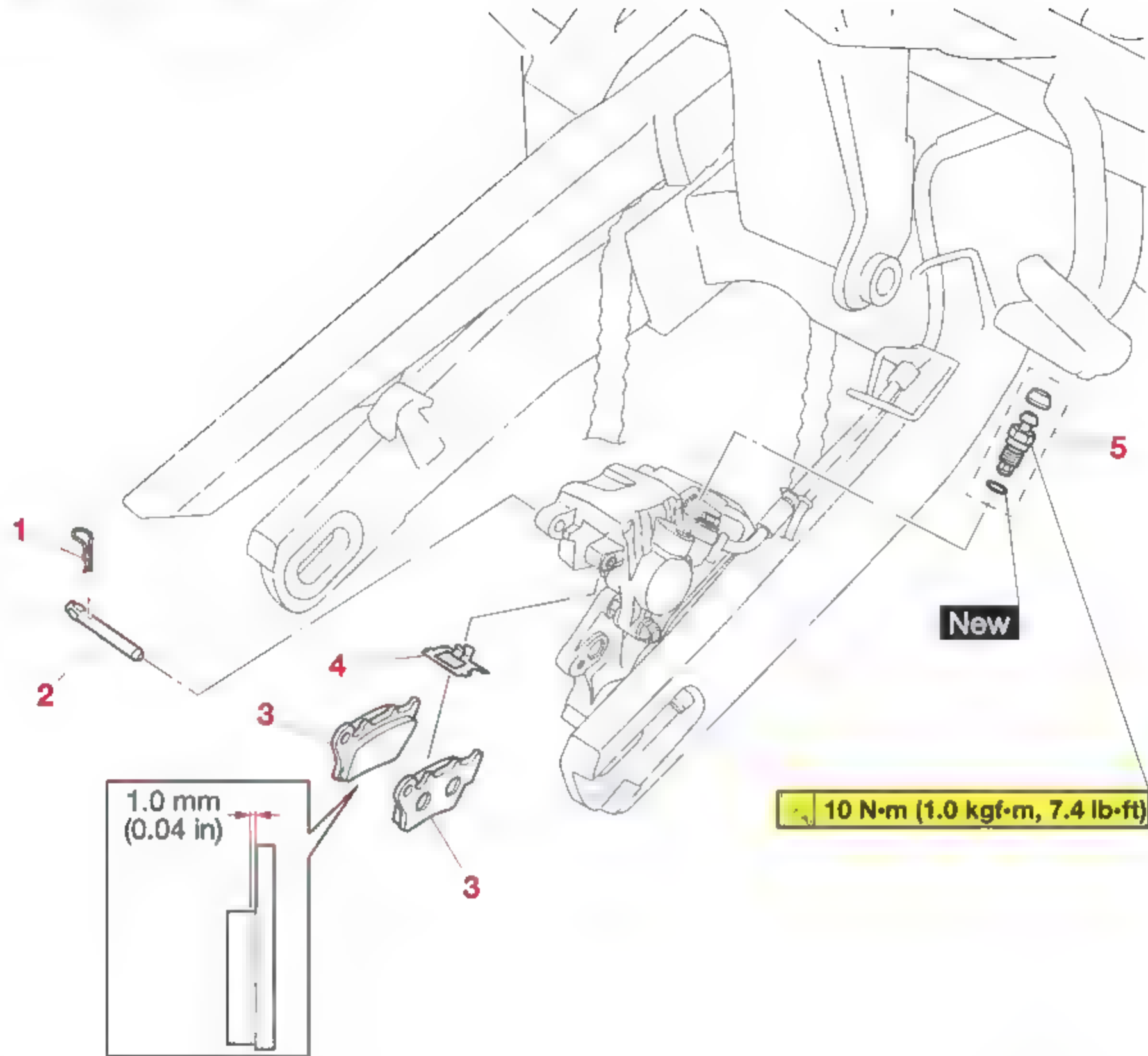
6. Check:

- Brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-15.

EAS20031

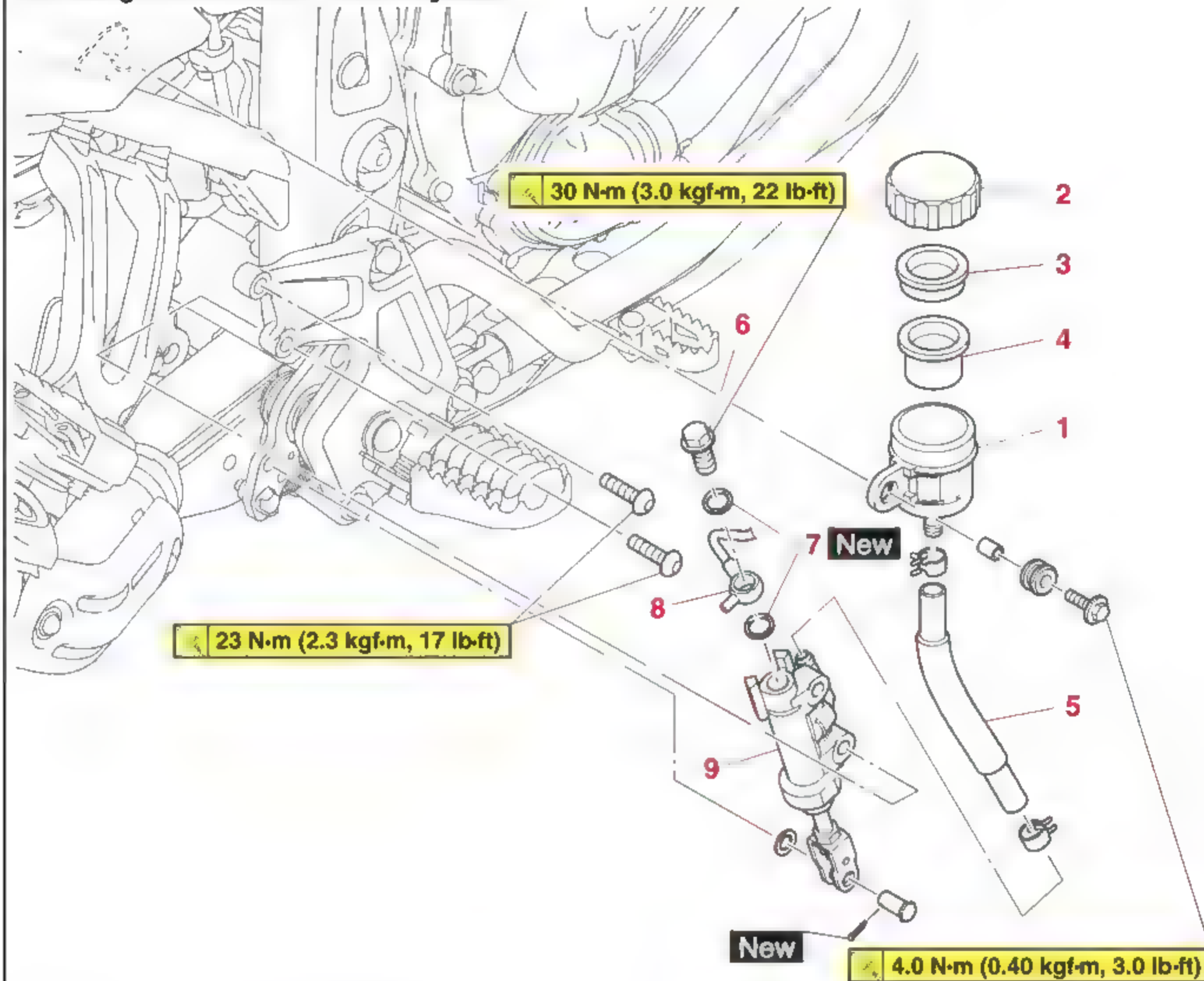
REAR BRAKE

Removing the rear brake pads



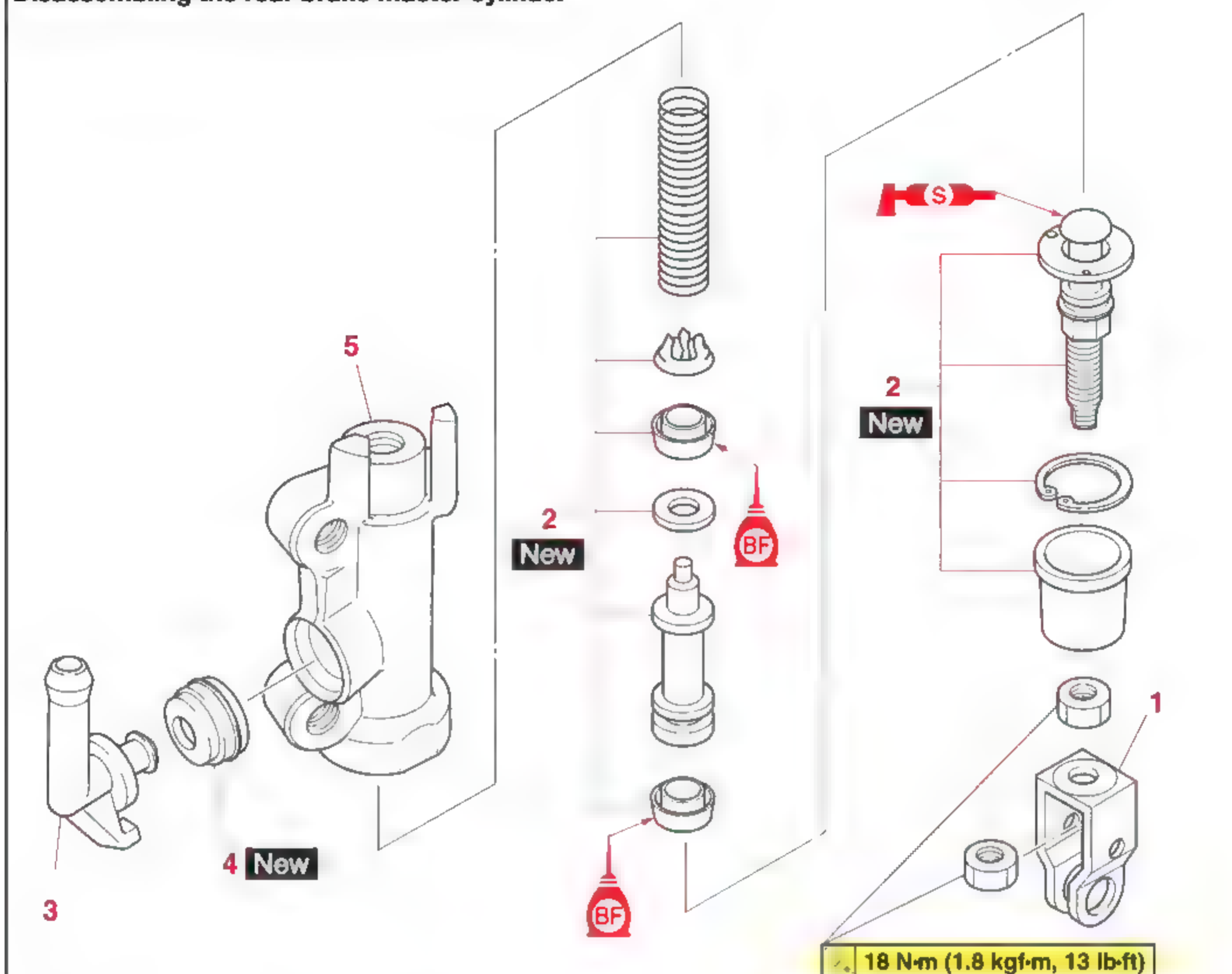
Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-18.
1	Brake pad clip	1	
2	Brake pad pin	1	
3	Brake pad	2	
4	Brake pad spring	1	
5	Brake caliper bleed screw	1	Loosen.

Removing the rear brake master cylinder



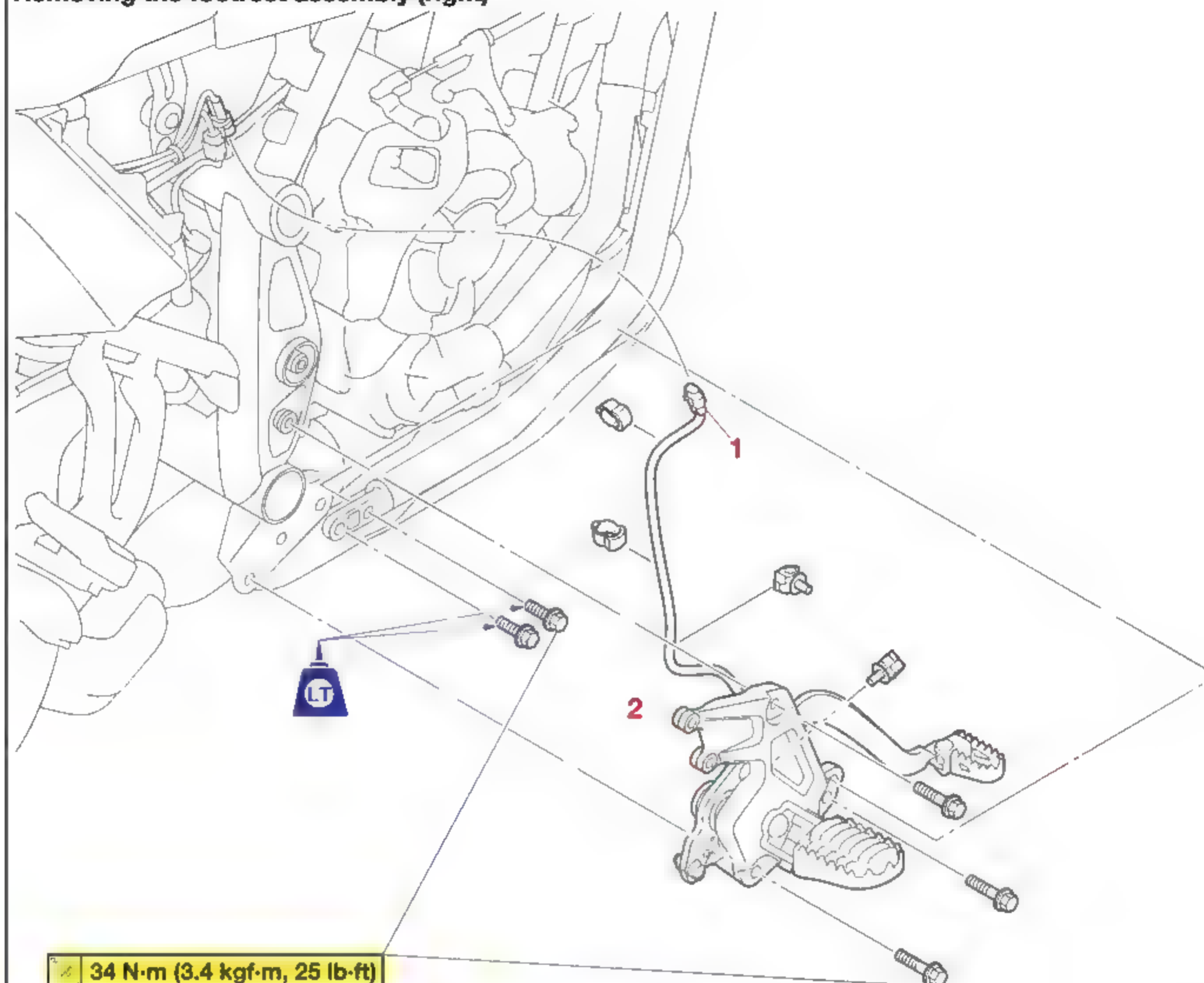
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
1	Brake fluid reservoir	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir hose	1	
6	Rear brake hose union bolt	1	
7	Brake hose gasket	2	
8	Brake hose (rear brake master cylinder to hydraulic unit)	1	
9	Rear brake master cylinder	1	

Disassembling the rear brake master cylinder



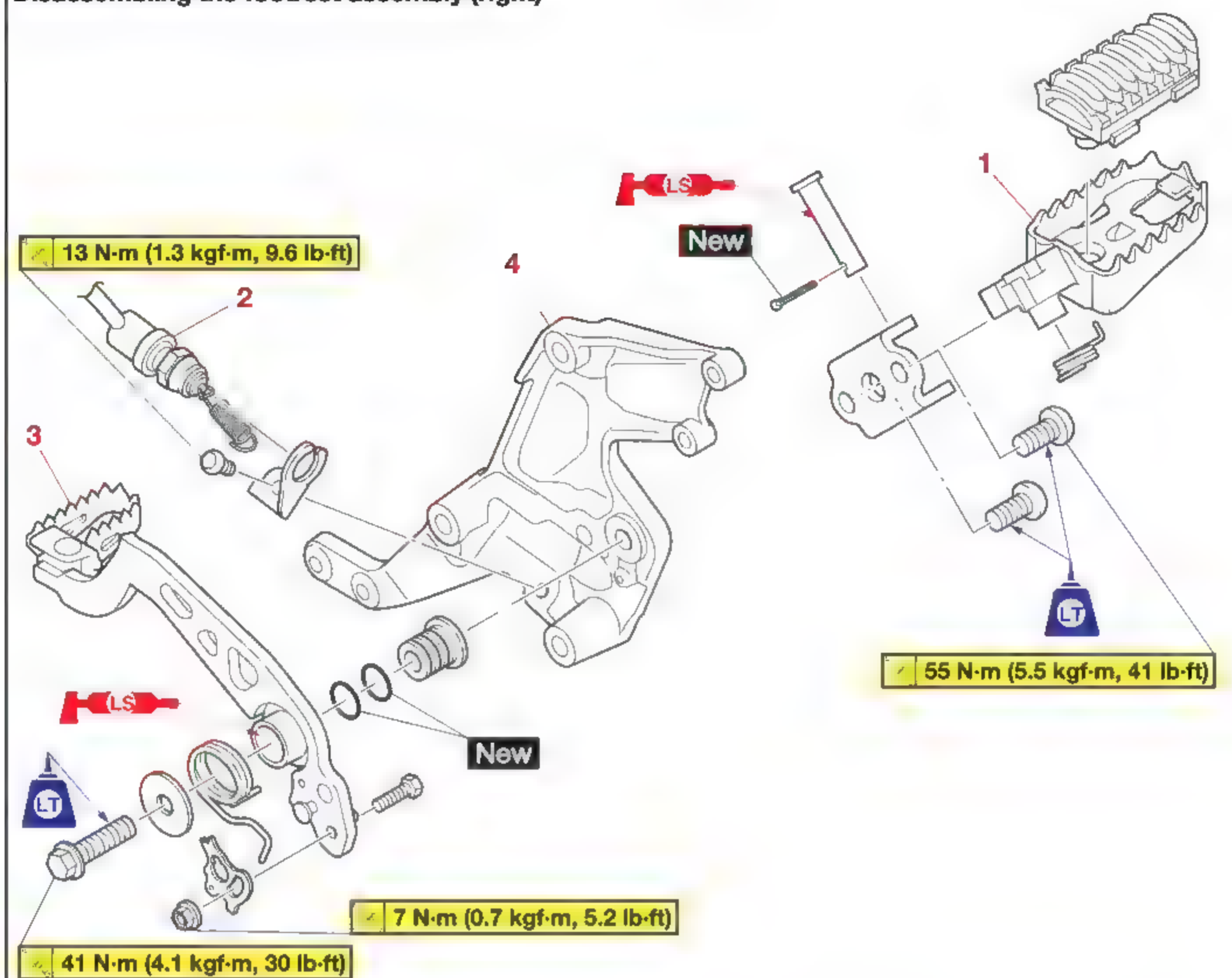
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder yoke	1	
2	Brake master cylinder kit	1	
3	Hose joint	1	
4	Bushing	1	
5	Brake master cylinder body	1	

Removing the footrest assembly (right)



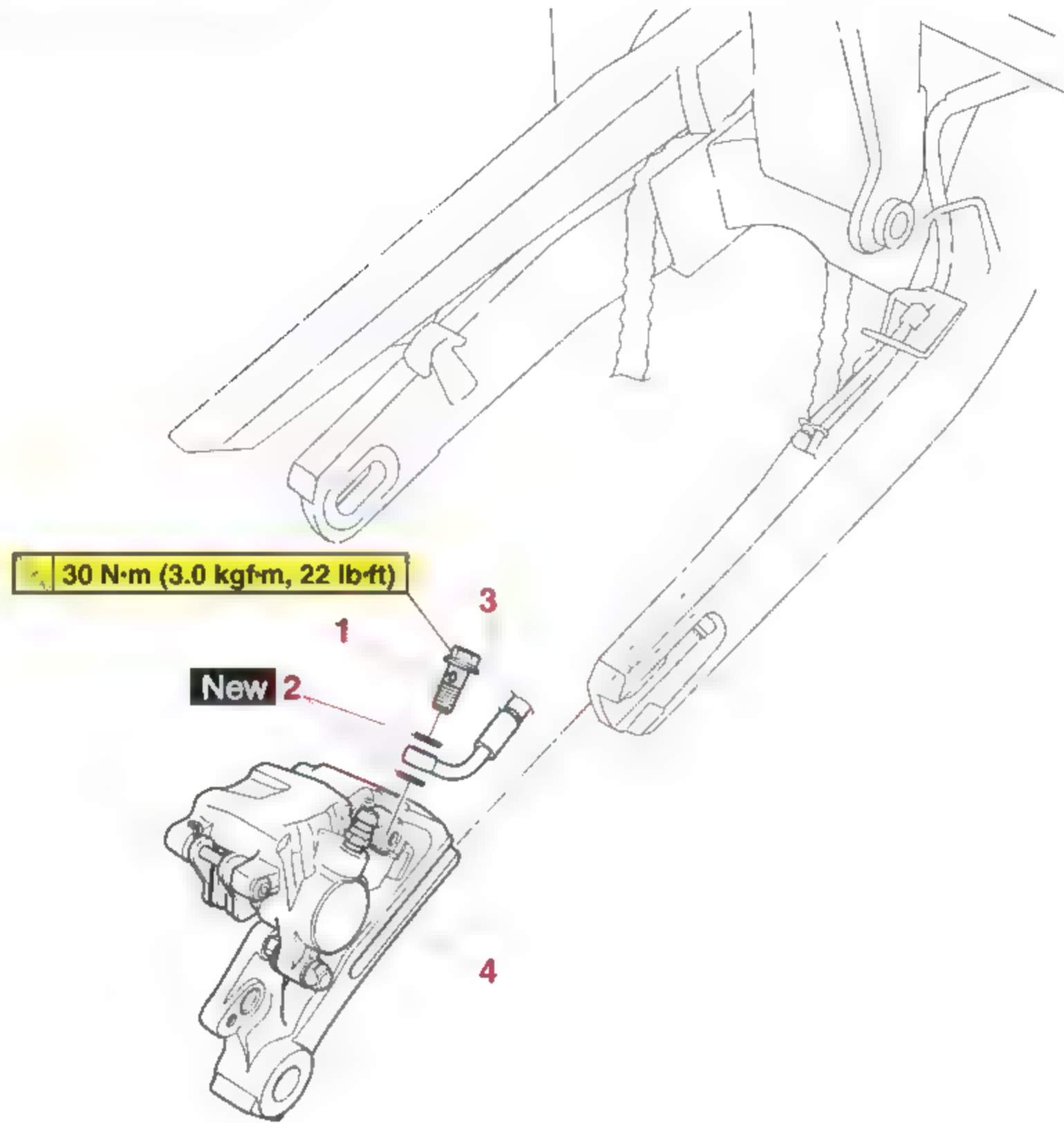
Order	Job/Parts to remove	Q'ty	Remarks
	Side cover (right)		Refer to "GENERAL CHASSIS (2)" on page 4-2.
1	Rear brake light switch coupler	1	Disconnect.
2	Footrest assembly (right)	1	

Disassembling the footrest assembly (right)



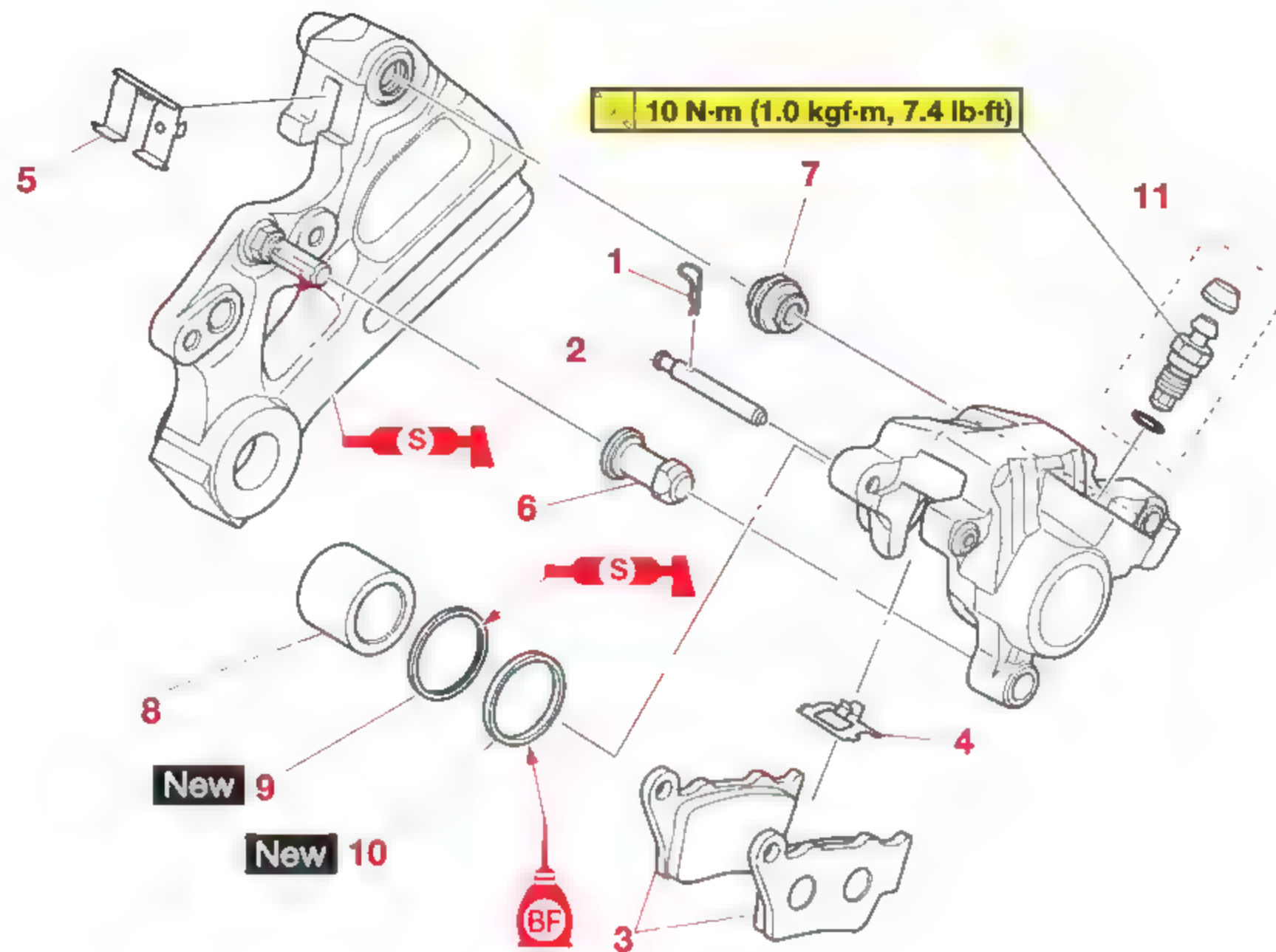
Order	Job/Parts to remove	Q'ty	Remarks
1	Footrest (right)	1	
2	Rear brake light switch	1	
3	Rear brake pedal	1	
4	Footrest bracket (right)	1	

Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
	Rear wheel		Refer to "REAR WHEEL" on page 4-18.
1	Rear brake hose union bolt	1	
2	Brake hose gasket	2	
3	Brake hose (hydraulic unit to rear brake caliper)	1	
4	Rear brake caliper	1	

Disassembling the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake pad clip	1	
2	Brake pad pin	1	
3	Brake pad	2	
4	Brake pad spring	1	
5	Brake pad support	1	
6	Boot	1	
7	Boot	1	
8	Brake caliper piston	1	
9	Brake caliper piston dust seal	1	
10	Brake caliper piston seal	1	
11	Brake caliper bleed screw	1	

EAS30183

INTRODUCTION

EWA14101

WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Avoid brake fluid coming into contact with the eyes as it can cause serious injury.

FIRST AID FOR BRAKE FLUID ENTERING THE EYES:

- Flush with water for 15 minutes and get immediate medical attention.

4. Replace:

- Brake disc

Refer to "REAR WHEEL" on page 4-18.



Rear brake disc bolt
30 N·m (3.0 kgf·m, 22 lb·ft)
LOCTITE®

EAS30185

REPLACING THE REAR BRAKE PADS

TIP

When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

1. Remove:

- Rear wheel

Refer to "REMOVING THE REAR WHEEL" on page 4-21.

2. Measure:

- Brake pad wear limit "a"

Out of specification → Replace the brake pads as a set.



Brake pad lining thickness limit
1.0 mm (0.04 in)

EAS30184

CHECKING THE REAR BRAKE DISC

1. Check:

- Rear brake disc

Damage/galling → Replace.

2. Measure:

- Brake disc deflection

Out of specification → Replace.

Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-31.



Brake disc runout limit (as measured on wheel)
0.15 mm (0.0059 in)

3. Measure:

- Brake disc thickness

Measure the brake disc thickness at a few different locations.

Out of specification → Replace.

Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-31.



Brake disc thickness limit
4.5 mm (0.18 in)



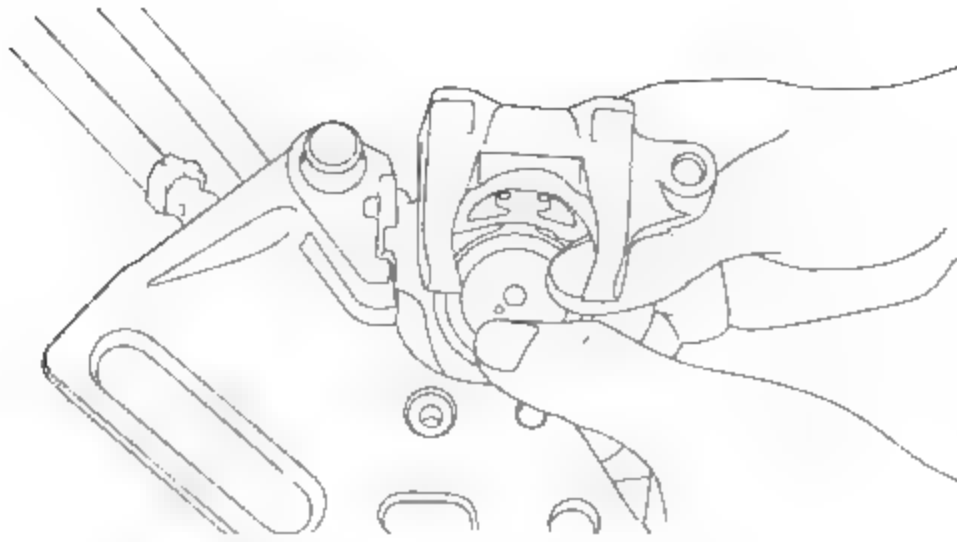
3. Install:

- Brake pad spring
 (into the rear brake caliper)

- Brake pads

a. Connect a clear plastic hose tightly to the bleed screw. Put the other end of the hose into an open container.

b. Loosen the bleed screw and push the brake caliper piston into the brake caliper with your finger.



c. Tighten the bleed screw.



**Rear brake caliper bleed screw
10 N·m (1.0 kgf·m, 7.4 lb·ft)**

d. Install the brake pads and brake pad spring.

4. Install:

- Brake pad pin
- Brake pad clip
- Rear brake caliper

5. Install:

- Rear wheel
Refer to "INSTALLING THE REAR WHEEL" on page 4-23.

6. Check:

- Brake fluid level
Below the minimum level mark → Add the specified brake fluid to the proper level.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-16.

7. Check:

- Brake pedal operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

REMOVING THE REAR BRAKE CALIPER

TIP

Before removing the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:

- Rear brake hose union bolt
- Brake hose gaskets
- Brake hose (hydraulic unit to rear brake caliper)

TIP

Put the end of the brake hose into a container and pump out the brake fluid carefully.

2. Remove:

- Rear wheel

- Rear brake caliper

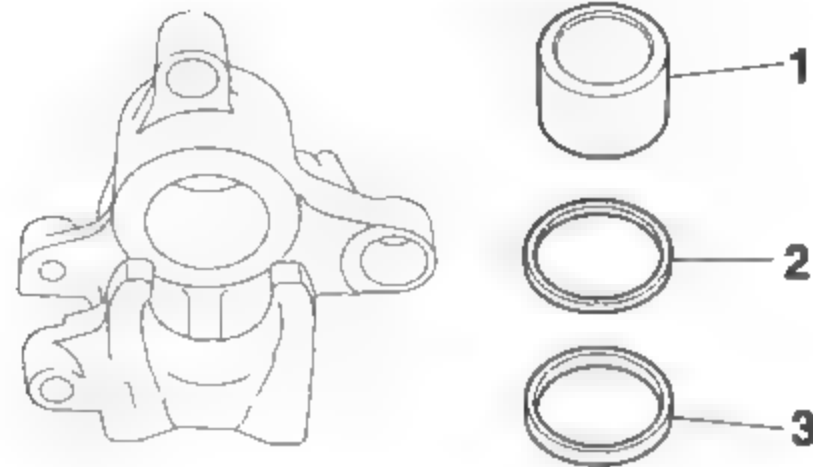
Refer to "REMOVING THE REAR WHEEL" on page 4-21.

EAS30187

DISASSEMBLING THE REAR BRAKE CALIPER

1. Remove:

- Brake caliper piston "1"
- Brake caliper piston dust seal "2"
- Brake caliper piston seal "3"

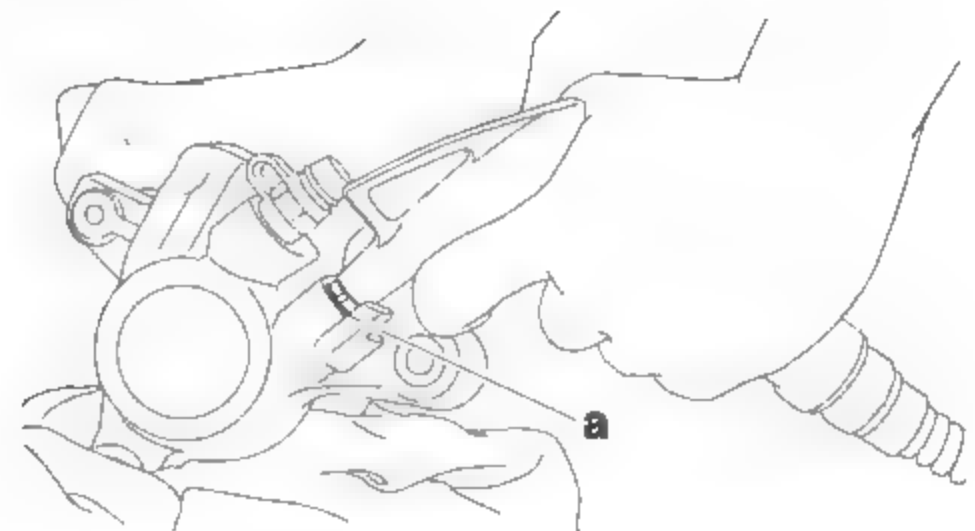


a. Blow compressed air into the brake hose joint opening "a" to force out the piston from the brake caliper.

EWA13550

WARNING

- Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake caliper.
- Never try to pry out the brake caliper piston.



b. Remove the brake caliper piston dust seal and brake caliper piston seal.

EAS30188

CHECKING THE REAR BRAKE CALIPER

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seal	Every two years
Piston dust seal	Every two years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

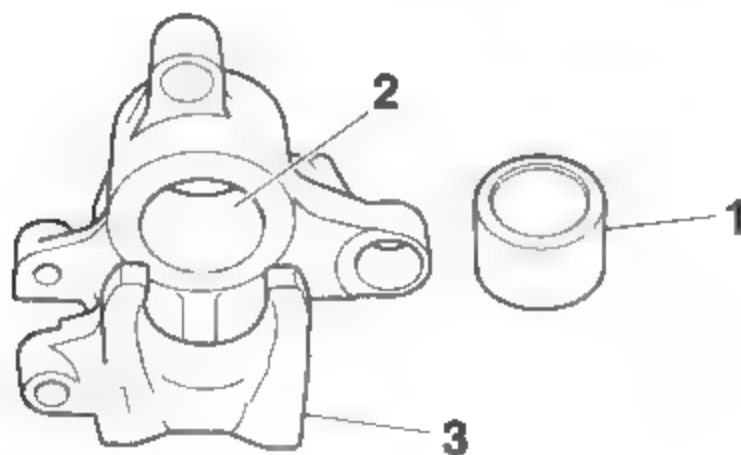
1. Check:

- Brake caliper piston "1"
Rust/scratches/wear → Replace the brake caliper piston.
- Brake caliper cylinder "2"
Scratches/wear → Replace the brake caliper assembly.
- Brake caliper body "3"
Cracks/damage → Replace the brake caliper assembly.
- Brake fluid delivery passages (brake caliper body)
Obstruction → Blow out with compressed air.

EWA17070

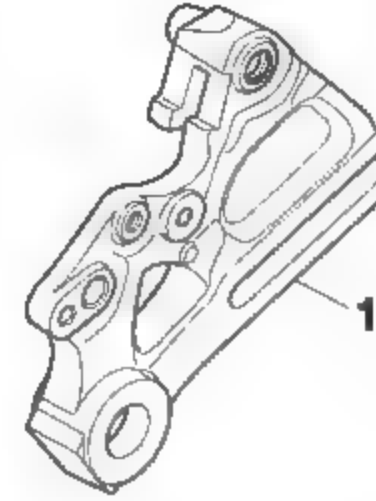


Whenever a brake caliper is disassembled, replace the brake caliper piston dust seal and brake caliper piston seal.



2. Check:

- Rear brake caliper bracket "1"
Cracks/damage → Replace.
Refer to "REAR WHEEL" on page 4-18.



EAS30189

ASSEMBLING THE REAR BRAKE CALIPER

EWA17080



- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components as they will cause the brake caliper piston dust seal and brake caliper piston seal to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston dust seal and brake caliper piston seal.



**Specified brake fluid
DOT 4**

EAS30190

INSTALLING THE REAR BRAKE CALIPER

1. Install:

- Rear brake caliper
- Rear wheel
Refer to "INSTALLING THE REAR WHEEL" on page 4-23.

2. Install:

- Brake hose gaskets **New**
- Brake hose (hydraulic unit to rear brake caliper)
- Rear brake hose union bolt



**Rear brake hose union bolt
30 N·m (3.0 kgf·m, 22 lb·ft)**

EWA13531

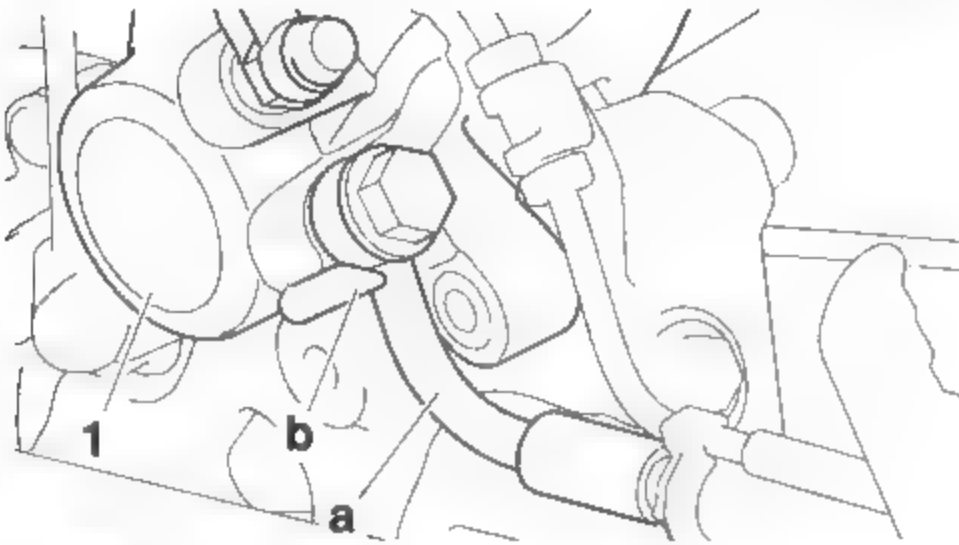


Proper brake hose routing is essential to insure safe vehicle operation.

ECA14170

NOTICE

When installing the brake hose onto the brake caliper "1", make sure the brake pipe "a" touches the projection "b" on the brake caliper.



3. Fill:

- Brake fluid reservoir
(with the specified amount of the specified brake fluid)



**Specified brake fluid
DOT 4**

EWA13090

WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:

- Brake system
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

5. Check:

- Brake fluid level
Below the minimum level mark → Add the specified brake fluid to the proper level.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-16.

6. Check:

- Brake pedal operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

EAS30193

REMOVING THE REAR BRAKE MASTER CYLINDER

1. Remove:

- Brake hose union bolt
- Brake hose gaskets
- Brake hose (rear brake master cylinder to hydraulic unit)

TIP

To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.

EAS30194

CHECKING THE REAR BRAKE MASTER CYLINDER

1. Check:

- Brake master cylinder
Damage/scratches/wear → Replace.
- Brake fluid delivery passages (brake master cylinder body)
Obstruction → Blow out with compressed air.

2. Check:

- Brake master cylinder kit
Damage/scratches/wear → Replace.

3. Check:

- Brake fluid reservoir
- Brake fluid reservoir diaphragm holder
Cracks/damage → Replace.
- Brake fluid reservoir diaphragm
Damage/wear → Replace.

4. Check:

- Brake hose (rear brake master cylinder to hydraulic unit)
- Brake fluid reservoir hose
Cracks/damage → Replace.

EAS30195

ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520

WARNING

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.

- Never use solvents on internal brake components.



**Specified brake fluid
DOT 4**

1. Install:

- Brake master cylinder kit **New**

EAS30198

INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:

- Brake hose gaskets **New**
- Brake hose (rear brake master cylinder to hydraulic unit)
- Brake hose union bolt
- Brake fluid reservoir hose



**Rear brake hose union bolt
30 N·m (3.0 kgf·m, 22 lb·ft)**

EWA19531

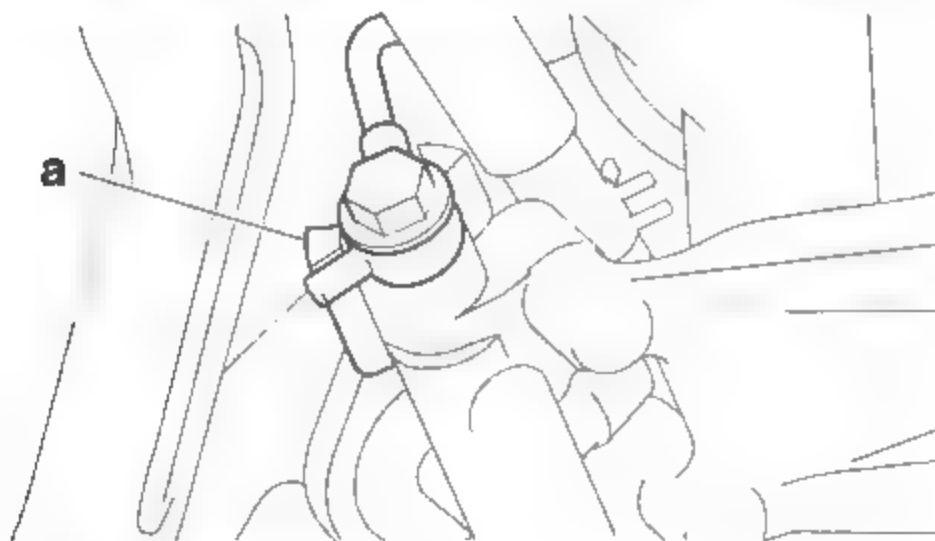
WARNING

Proper brake hose routing is essential to insure safe vehicle operation.

ECA14160

NOTICE

When installing the brake hose onto the brake master cylinder, make sure the brake pipe touches the projection "a" as shown.



2. Fill:

- Brake fluid reservoir (with the specified amount of the specified brake fluid)



**Specified brake fluid
DOT 4**

EAS11693

WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

EAT11693

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

3. Bleed:

- Brake system
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

4. Check:

- Brake fluid level
Below the minimum level mark → Add the specified brake fluid to the proper level.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-16.

EAS33281

ASSEMBLING THE BRAKE PEDAL

1. Install:

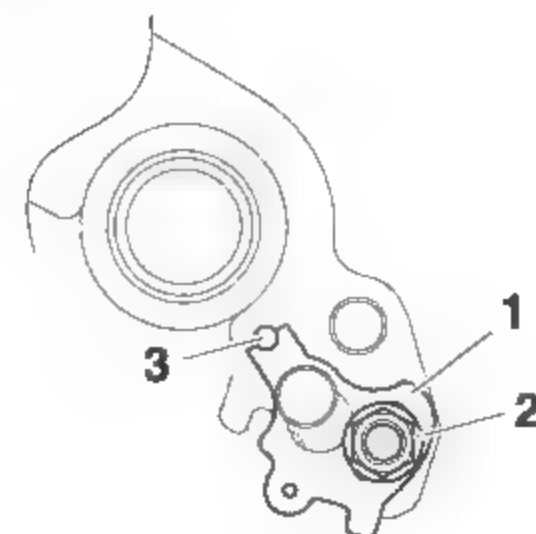
- Brake pedal plate "1"

TIP

Before tightening the brake pedal plate nut "2", insert the suitable pin (d=4 mm (0.16 in)) "3", into the brake pedal and brake pedal plate as illustration.



**Brake pedal plate nut
7 N·m (0.7 kgf·m, 5.2 lb·ft)**

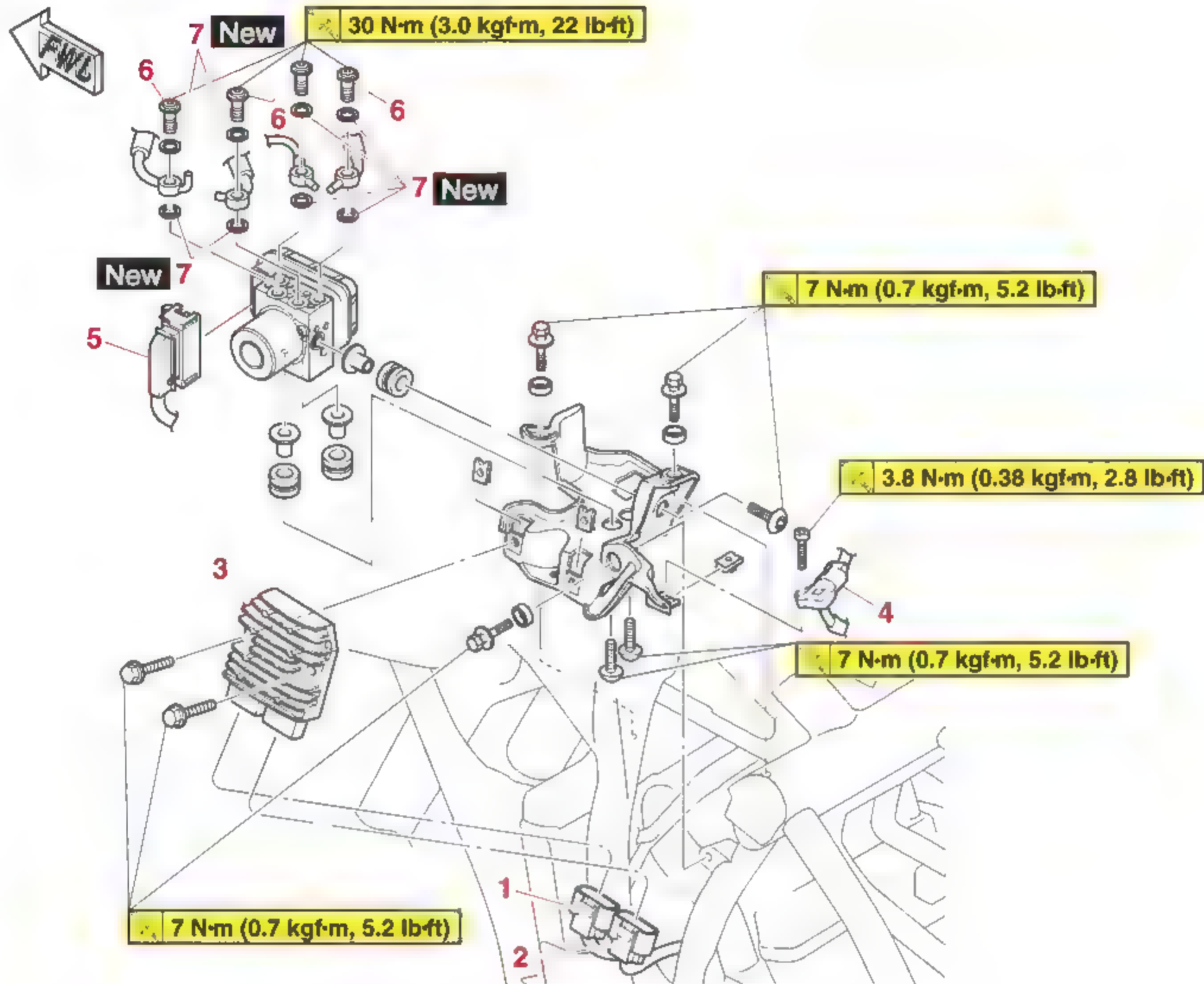


ABS (ANTI-LOCK BRAKE SYSTEM)

EAS20032

ABS (ANTI-LOCK BRAKE SYSTEM)

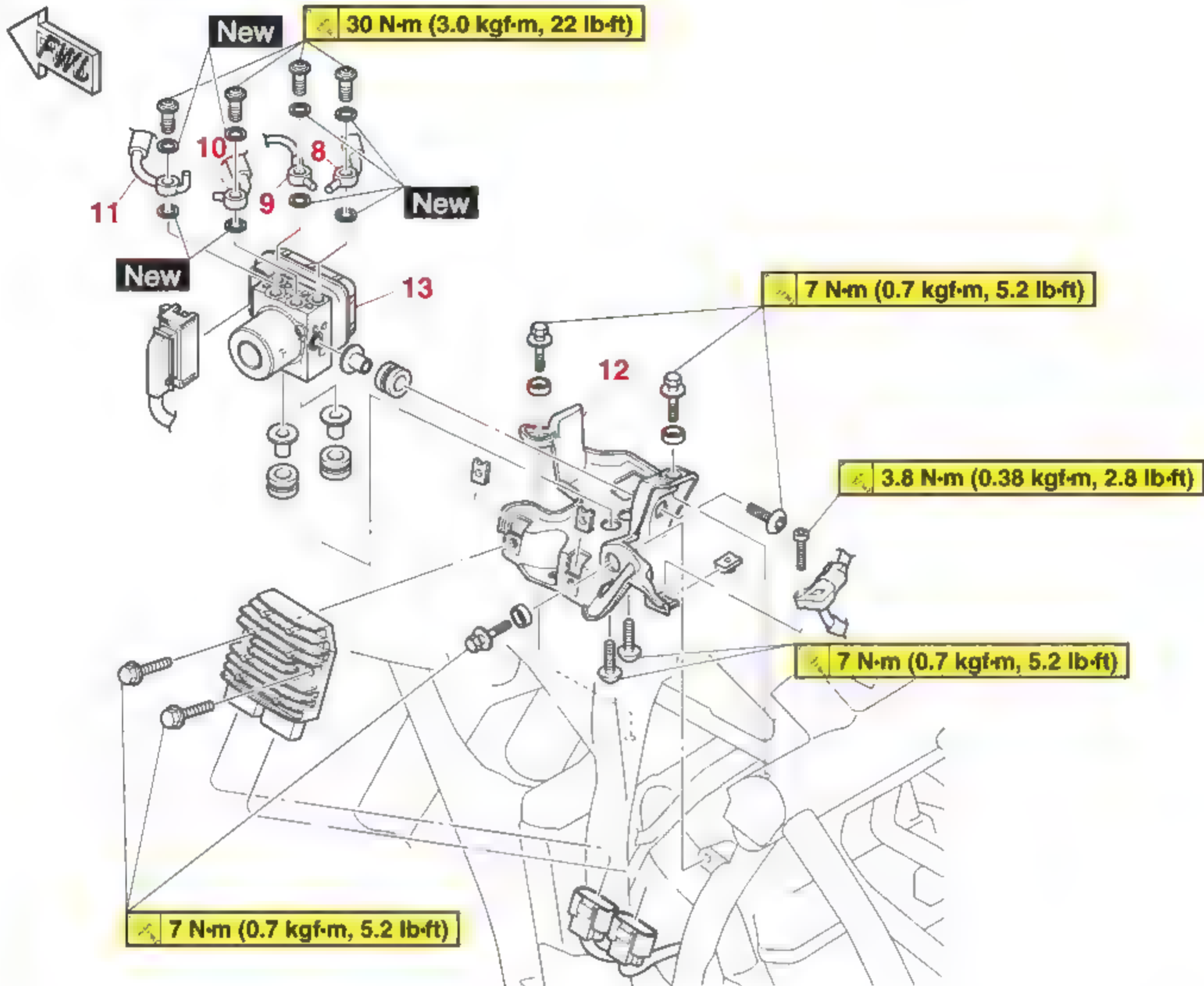
Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoops/Air ducts/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
1	Stator coil coupler	1	Disconnect.
2	Rectifier/regulator coupler	1	Disconnect.
3	Rectifier/regulator	1	
4	Intake air pressure sensor	1	
5	ABS ECU coupler	1	Disconnect.
6	Brake hose union bolt	4	
7	Gasket	8	

ABS (ANTI-LOCK BRAKE SYSTEM)

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
8	Brake hose (hydraulic unit to rear brake caliper)	1	Disconnect.
9	Brake hose (hydraulic unit to right front brake caliper)	1	Disconnect.
10	Brake hose (rear brake master cylinder to hydraulic unit)	1	Disconnect.
11	Brake hose (front brake master cylinder to hydraulic unit)	1	Disconnect.
12	Hydraulic unit bracket	1	
13	Hydraulic unit assembly	1	

ABS (ANTI-LOCK BRAKE SYSTEM)

EAS31036

REMOVING THE HYDRAULIC UNIT ASSEMBLY

ECA21081

NOTICE

Unless necessary, avoid removing and installing the brake hoses of the hydraulic unit assembly.

FWA13930

WARNING

Refill with the same type of brake fluid that is already in the system. Mixing fluids may result in a harmful chemical reaction, leading to poor braking performance.

ECA18241

NOTICE

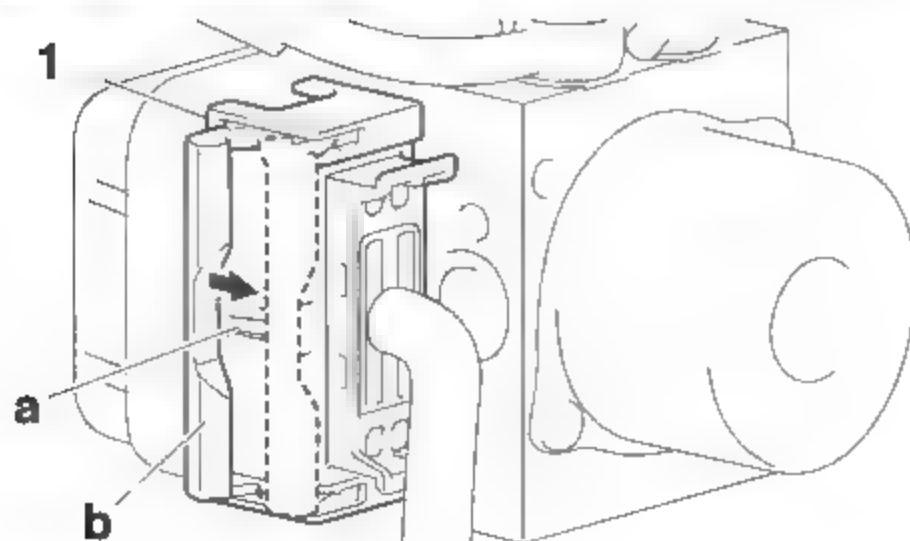
- Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.
- Do not turn the main switch to "ON" when removing the hydraulic unit assembly.
- Do not clean with compressed air.
- Do not reuse the brake fluid.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Do not allow any brake fluid to contact the couplers. Brake fluid may damage the couplers and cause bad contacts.
- If the union bolts for the hydraulic unit assembly have been removed, be sure to tighten them to the specified torque and bleed the brake system.

1. Disconnect:

- ABS ECU coupler "1"

TIP

While pushing the portion "a" of the ABS ECU coupler, move the lock lever "b" in the direction of the arrow shown to disconnect the coupler.



2. Remove:

- Brake hoses

TIP

Do not operate the brake lever and brake pedal while removing the brake hoses.

ECA14530

NOTICE

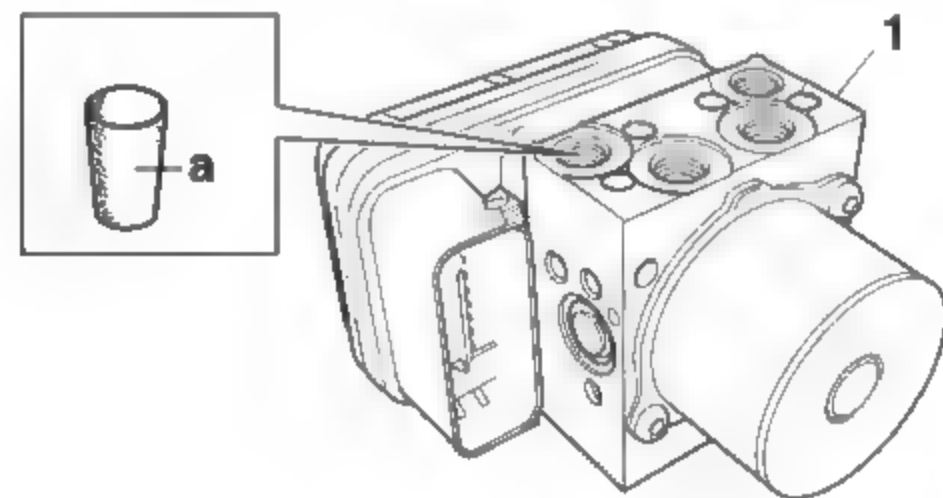
When removing the brake hoses, cover the area around the hydraulic unit to catch any spilt brake fluid. Do not allow the brake fluid to contact other parts.

3. Remove:

- Hydraulic unit assembly "1"

TIP

- To avoid brake fluid leakage and to prevent foreign materials from entering the hydraulic unit assembly, insert a rubber plug "a" or a bolt (M10 × 1.25) into each brake hose union bolt hole.
- When using a bolt, do not tighten the bolt until the bolt head touches the hydraulic unit. Otherwise, the brake hose union bolt seating surface could be deformed.



EAS31037

CHECKING THE HYDRAULIC UNIT ASSEMBLY

1. Check:

- Hydraulic unit assembly
Cracks/damage → Replace the hydraulic unit assembly and the brake hoses that are connected to the assembly as a set.

EAS31039

INSTALLING THE HYDRAULIC UNIT ASSEMBLY

1. Install:

- Hydraulic unit assembly
- Hydraulic unit bracket

ABS (ANTI-LOCK BRAKE SYSTEM)



Hydraulic unit assembly bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)
Hydraulic unit bracket bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)

TIP

Do not allow any foreign materials to enter the hydraulic unit assembly or the brake hoses when installing the hydraulic unit assembly.

ECA21110

NOTICE

Do not remove the rubber plugs or bolts (M10 × 1.25) installed in the brake hose union bolt holes before installing the hydraulic unit assembly.

2. Remove:

- Rubber plugs or bolts (M10 × 1.25)

3. Install:

- Brake hose (front brake master cylinder to hydraulic unit) "1"
- Brake hose (hydraulic unit to right front brake caliper) "2"
- Brake hose (hydraulic unit to rear brake caliper) "3"
- Brake hose (rear brake master cylinder to hydraulic unit) "4"



Brake hose union bolt
30 N·m (3.0 kgf·m, 22 lb·ft)

ECA21121

NOTICE

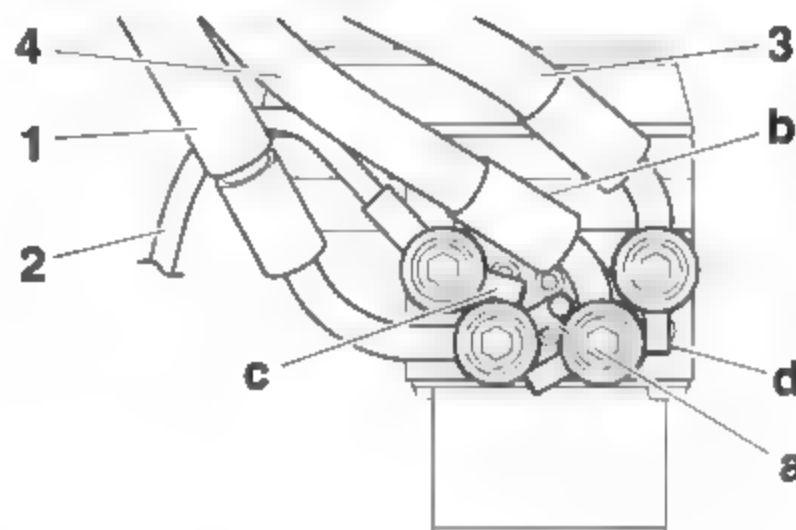
If the brake hose union bolt does not turn easily, replace the hydraulic unit assembly, brake hoses, and related parts as a set.

- Temporarily install the brake hoses as shown in the illustration.
- Position the brake hose (front brake master cylinder to hydraulic unit) "1" so that its projection "a" contacts the brake hose (rear brake master cylinder to hydraulic unit) "4", and then temporarily tighten the union bolt for the brake hose (front brake master cylinder to hydraulic unit).
- Temporarily tighten the union bolt for the brake hose (rear brake master cylinder to hydraulic unit) "4".

TIP

Make sure that the pipe section "b" of the brake hose (rear brake master cylinder to hydraulic unit) does not contact the hydraulic unit.

- Position the brake hose (hydraulic unit to right front brake caliper) "2" so that its projection "c" contacts the brake hose (front brake master cylinder to hydraulic unit) "1", and then temporarily tighten the union bolt for the brake hose (hydraulic unit to right front brake caliper).
- Position the brake hose (hydraulic unit to rear brake caliper) "3" so that its projection "d" contacts the brake hose (rear brake master cylinder to hydraulic unit) "4", and then temporarily tighten the union bolt for the brake hose (hydraulic unit to rear brake caliper).
- Tighten the brake hose union bolts to specification.

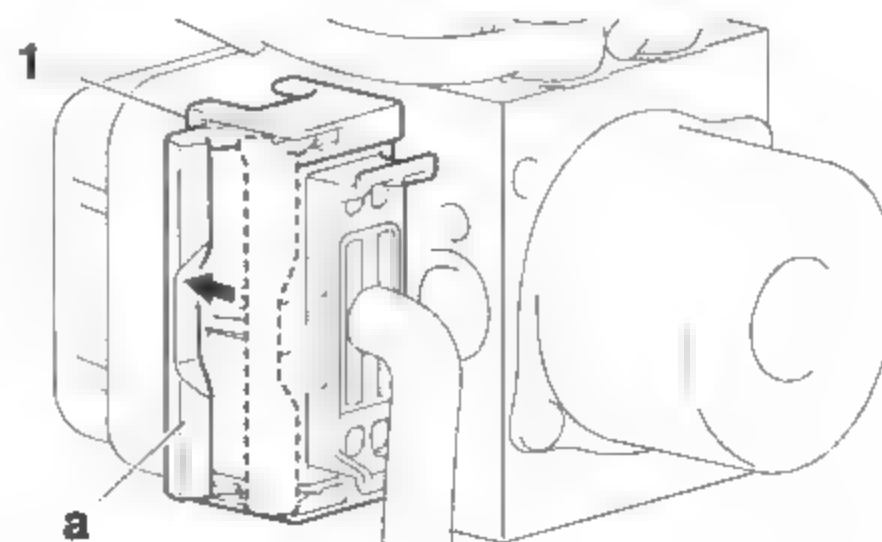


4. Connect:

- ABS ECU coupler "1"

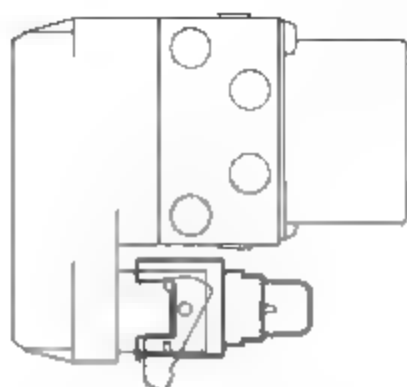
TIP

- Connect the ABS ECU coupler, and then push the lock lever "a" of the coupler in the direction of the arrow shown.
- Make sure that the ABS ECU coupler is connected in the correct position as shown in illustration "A".

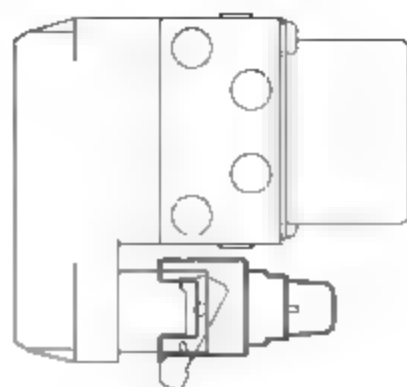


ABS (ANTI-LOCK BRAKE SYSTEM)

A



B



- A. The ABS ECU coupler is connected correctly.
B. The ABS ECU coupler is not connected.

5. Fill:

- Brake master cylinder reservoir
- Brake fluid reservoir
(with the specified amount of the specified brake fluid)



**Specified brake fluid
DOT 4**

EWA13090

WARNING

- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.**
- **When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.**

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

6. Bleed:

- Brake system
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

7. Check the operation of the hydraulic unit according to the brake lever and the brake pedal response. (Refer to "HYDRAULIC UNIT

OPERATION TESTS" on page 4-53.)

ECA14770

NOTICE

Always check the operation of the hydraulic unit according to the brake lever and the brake pedal response.

8. Delete the fault codes. (Refer to "[B-3] DELETING THE DTC" on page 9-21.)
9. Perform a trial run. (Refer to "CHECKING THE ABS WARNING LIGHT" on page 4-56.)

HYDRAULIC UNIT OPERATION TESTS

The reaction-force pulsating action generated in the brake lever and brake pedal when the ABS is activated can be tested when the vehicle is stopped.

The hydraulic unit operation can be tested using the following two methods.

- **Brake line routing confirmation:** this test checks the function of the ABS after the system was disassembled, adjusted, or serviced.
- **ABS reaction-force confirmation:** this test generates the same reaction-force pulsating action that is generated in the brake lever and brake pedal when the ABS is activated.

Brake line routing confirmation

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

- For the brake line routing confirmation, use the diagnosis of function of the Yamaha diagnostic tool.
- Before performing the brake line routing confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.

1. Place the vehicle on a suitable stand.
2. Turn the main switch to "OFF".
3. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
 - Battery voltage
Lower than 12.8 V → Charge or replace the battery.

ABS (ANTI-LOCK BRAKE SYSTEM)



Battery voltage
Higher than 12.8 V

TIP

If the battery voltage is lower than 12.8 V, charge the battery, and then perform brake line routing confirmation.

5. Disconnect the coupler from the CCU, and then connect the YDT to the coupler.



Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03273

TIP

- Yamaha diagnostic tool (A/I) (90890-03273) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to "YDT" on page 9-2.

6. Start the Yamaha diagnostic tool and display the diagnosis of function screen.
7. Select code No. 2, "Brake line routing confirmation".
8. Click "Actuator Check", and then operate the brake lever "1" and brake pedal "2" simultaneously.

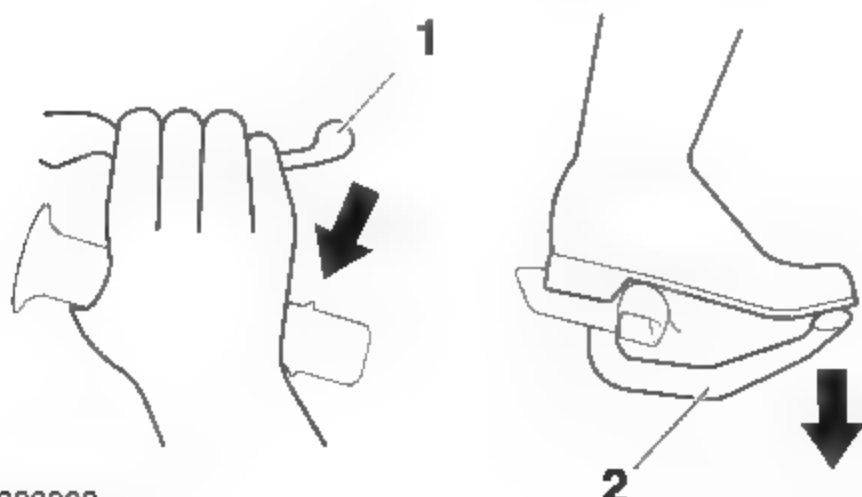
TIP

- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.

On: The hydraulic unit is operating.

Flashing: The conditions for operating the hydraulic unit have not been met.

Off: The brake lever and brake pedal are not being operated.

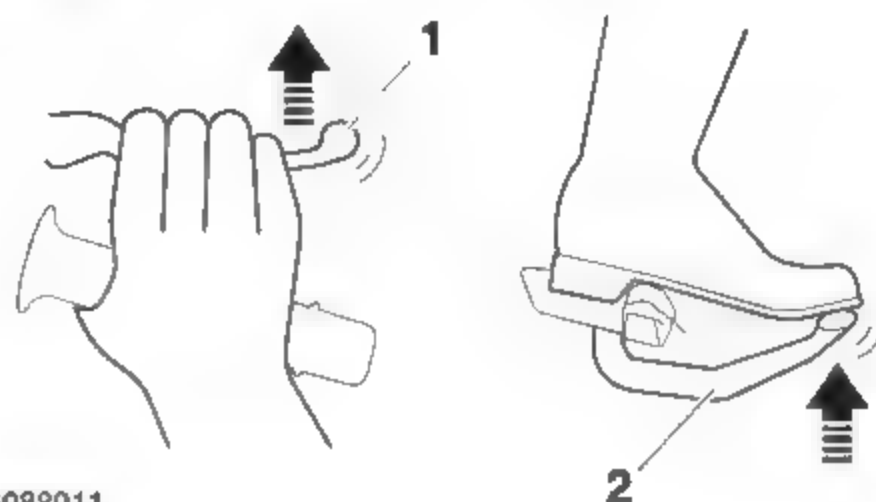


G088909

9. Check:

- Hydraulic unit operation

Click "Actuator Check", a single pulse will be generated in the brake lever "1", brake pedal "2", and again in the brake lever "1", in this order.



G088911

TIP

"ON" and "OFF" on the tool screen indicate when the brakes are being applied and released respectively.

EX-11

NOTICE

- Check that the pulse is felt in the brake lever, brake pedal, and again in the brake lever, in this order.
- If the pulse is felt in the brake pedal before it is felt in the brake lever, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.
- If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.

10. If the operation of the hydraulic unit is normal, delete all of the DTC.

ABS reaction-force confirmation

EW13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

- For the ABS reaction-force confirmation, use the diagnosis of function of the Yamaha diagnostic tool. For more information, refer to the operation manual of the Yamaha diagnostic tool.
- Before performing the ABS reaction-force confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.

ABS (ANTI-LOCK BRAKE SYSTEM)

1. Place the vehicle on a suitable stand.
2. Turn the main switch to "OFF".
3. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
 - Battery voltage
Lower than 12.8 V → Charge or replace the battery.



Battery voltage
Higher than 12.8 V

TIP

If the battery voltage is lower than 12.8 V, charge the battery, and then perform ABS reaction-force confirmation.

5. Disconnect the coupler from the CCU, and then connect the YDT to the coupler.



Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03273

TIP

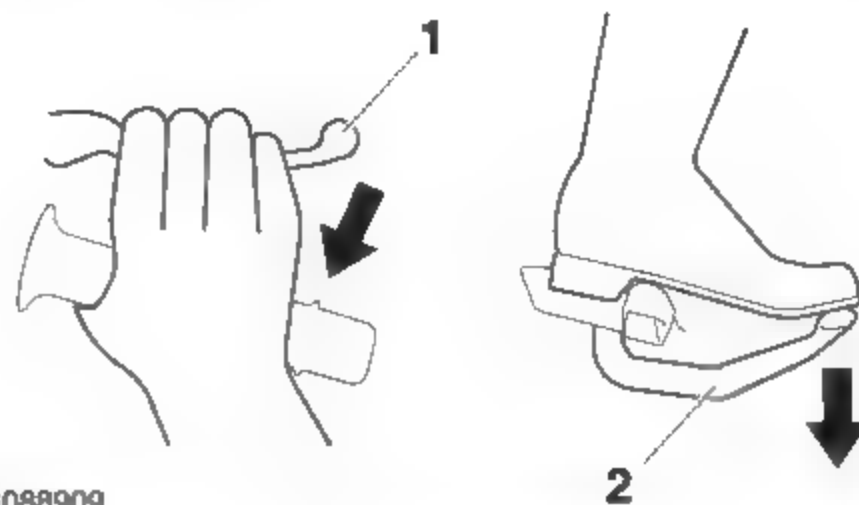
- Yamaha diagnostic tool (A/I) (90890-03273) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to "YDT" on page 9-2.

6. Start the Yamaha diagnostic tool and display the diagnosis of function screen.
7. Select code No. 1, "ABS reaction-force confirmation".
8. Click "Actuator Check", and then operate the brake lever "1" and brake pedal "2" simultaneously.

TIP

- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.
On: The hydraulic unit is operating.
Flashing: The conditions for operating the hydraulic unit have not been met.
Off: The brake lever and brake pedal are not being operated.

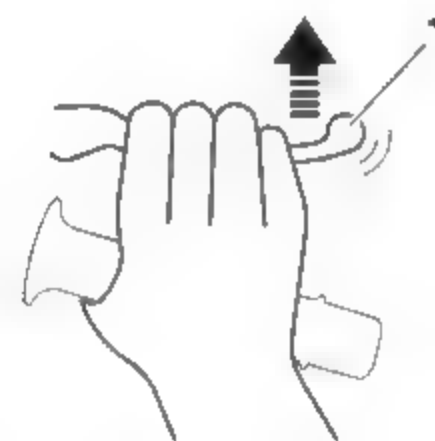


G088909

9. A reaction-force pulsating action is generated in the brake lever "1" and continues for a few seconds.

TIP

- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.
- "ON" and "OFF" on the tool screen indicate when the brakes are being applied and released respectively.

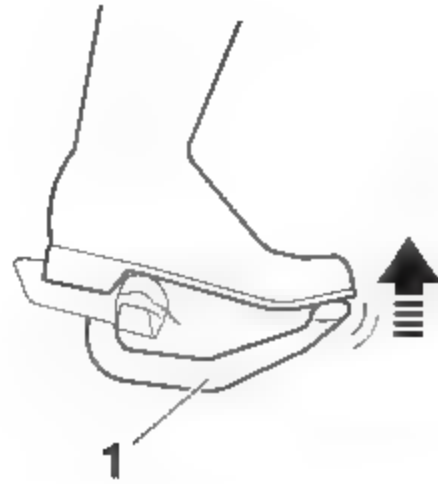


G088913

10. After the pulsating action has stopped in the brake lever, it is generated in the brake pedal "1" and continues for a few seconds.

TIP

- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.
- "ON" and "OFF" on the tool screen indicate when the brakes are being applied and released respectively.



G088914

11. After the pulsating action has stopped in the brake pedal, it is generated in the brake lever and continues for a few seconds.

TIP

- The reaction-force pulsating action consists of quick pulses.
- “ON” and “OFF” on the tool screen indicate when the brakes are being applied and released respectively.

ECA18260

NOTICE

- Check that the pulse is felt in the brake lever, brake pedal, and again in the brake lever, in this order.
- If the pulse is felt in the brake pedal before it is felt in the brake lever, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.
- If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.

12. Turn the main switch to “OFF”.
13. Remove the Yamaha diagnostic tool from the YDT coupler, and then install the CCU.
14. Turn the main switch to “ON”.
15. Set the stop/run/start switch to “○”.
16. Check for brake fluid leakage around the hydraulic unit.
Brake fluid leakage → Replace the hydraulic unit, brake hoses, and related parts as a set.
17. If the operation of the hydraulic unit is normal, delete all of the DTC.

EASS1041

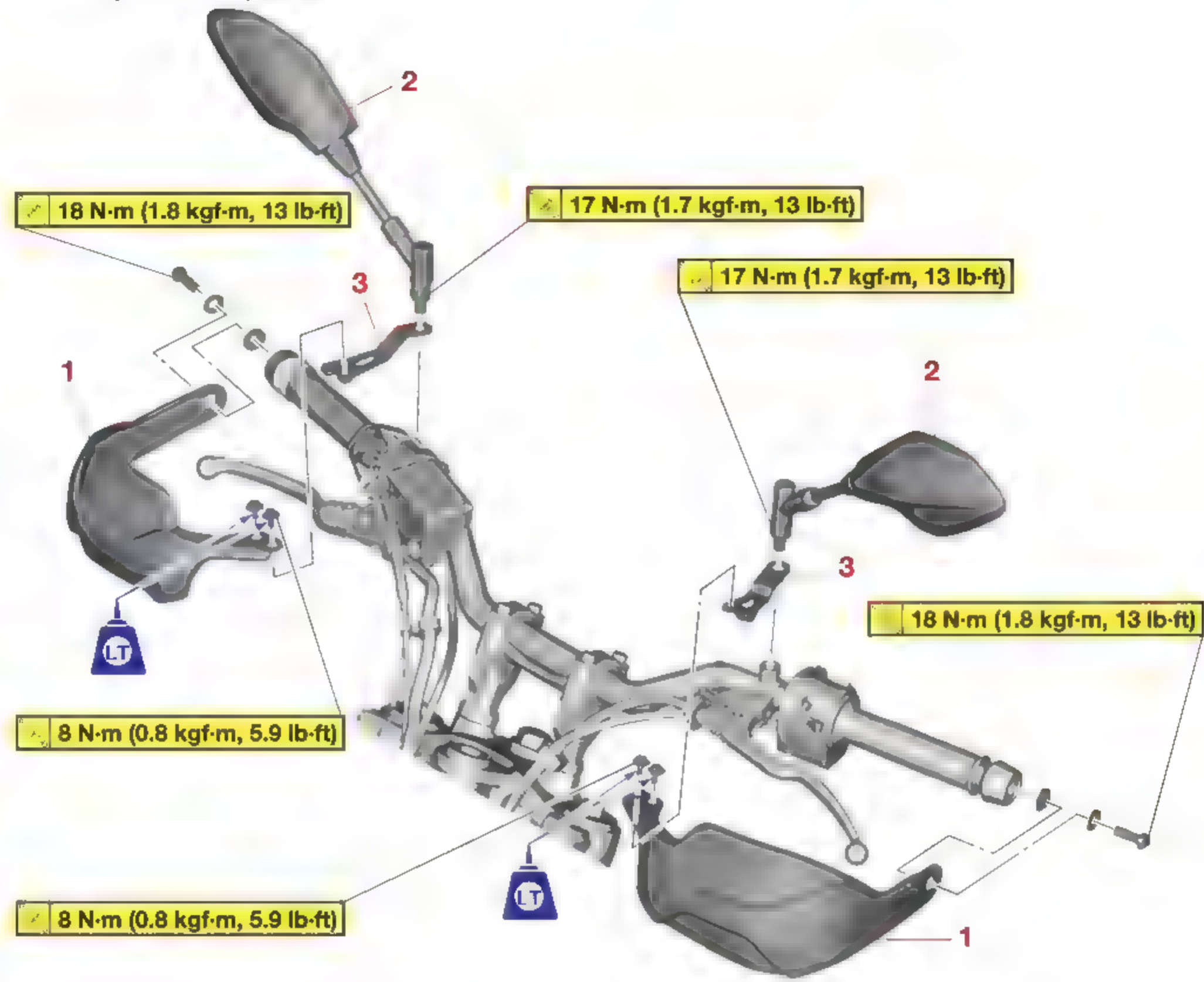
CHECKING THE ABS WARNING LIGHT

After all checks and servicing are completed, ensure that the ABS warning light goes off by walking the vehicle at a speed of faster than 10 km/h (6 mph) or performing a trial run.

EAS20033

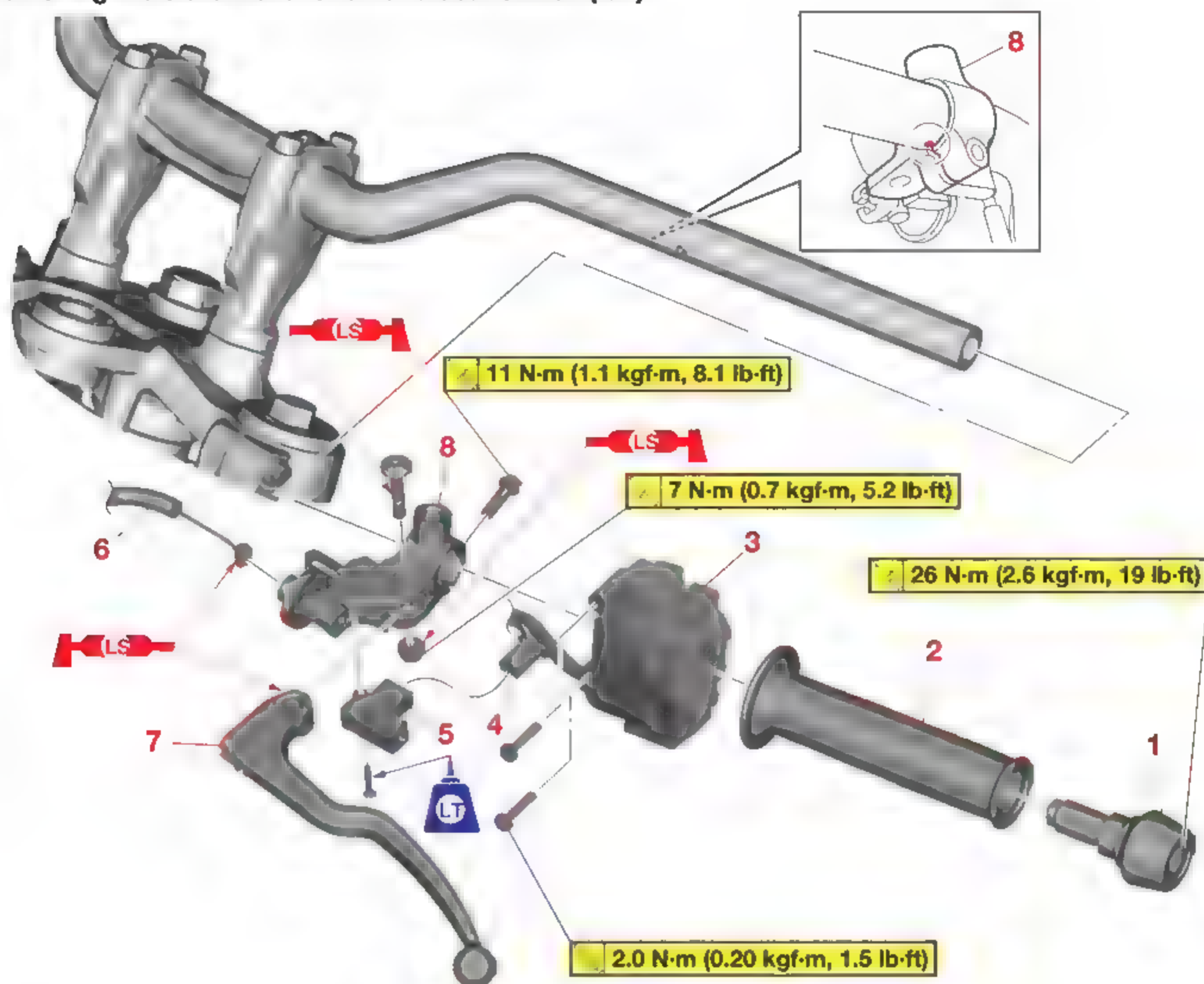
HANDLEBAR

Removing the handguards



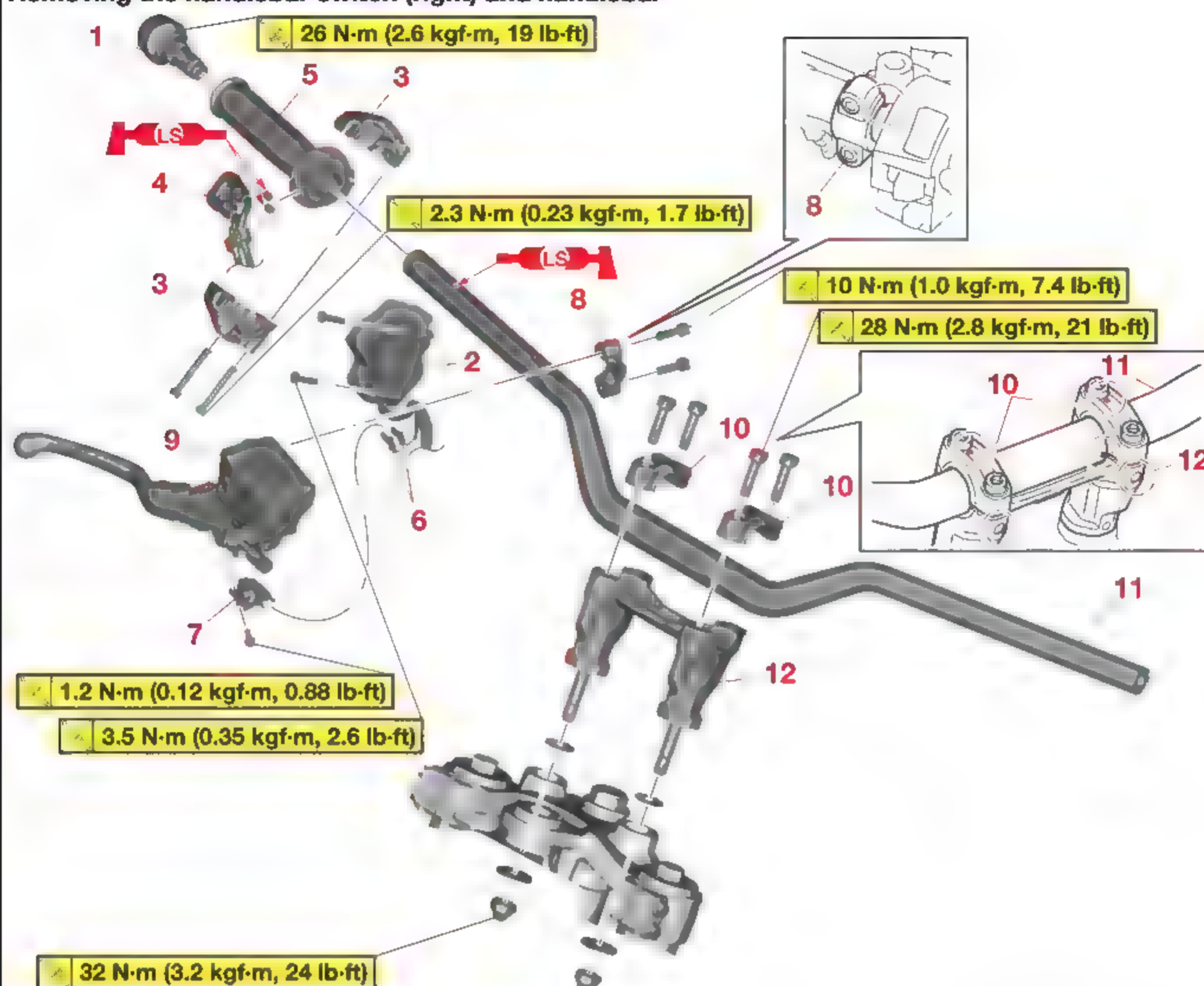
Order	Job/Parts to remove	Q'ty	Remarks
1	Handguard	2	
2	Rearview mirror	2	
3	Handguard bracket	2	

Removing the clutch lever and handlebar switch (left)



Order	Job/Parts to remove	Q'ty	Remarks
1	Grip end	1	
2	Handlebar grip	1	
3	Handlebar switch (left)	1	
4	Clutch switch coupler	1	Disconnect.
5	Clutch switch	1	
6	Clutch cable	1	Disconnect.
7	Clutch lever	1	
8	Clutch lever holder	1	

Removing the handlebar switch (right) and handlebar



Order	Job/Parts to remove	Q'ty	Remarks
1	Grip end	1	
2	Handlebar switch (right)	1	
3	Throttle cable housing	1	
4	Throttle cable	2	Disconnect.
5	Throttle grip	1	
6	Front brake light switch connector	2	Disconnect.
7	Front brake light switch	1	
8	Front brake master cylinder holder	1	
9	Front brake master cylinder	1	
10	Upper handlebar holder	2	
11	Handlebar	1	
12	Lower handlebar holder	1	

EAS30203

REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

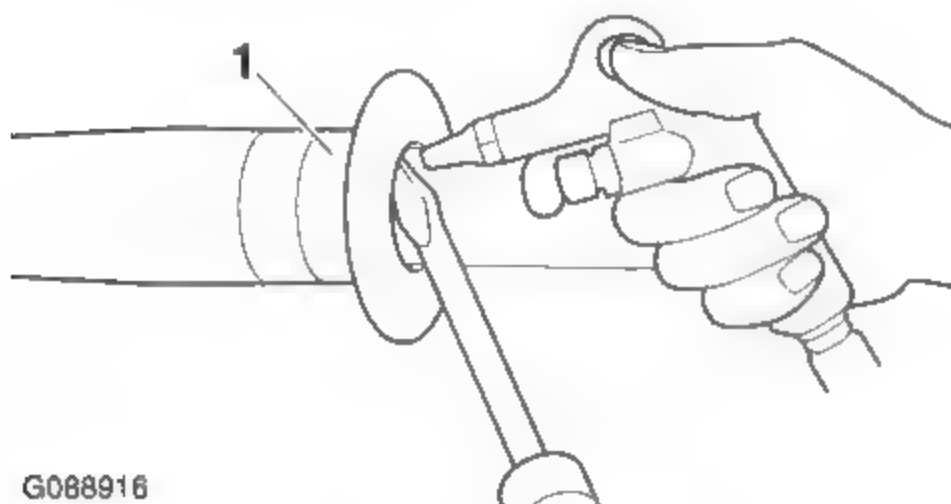
WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
 - Handlebar grip "1"

TIP

Blow compressed air between the left handlebar and the handlebar grip, and gradually push the grip off the handlebar.

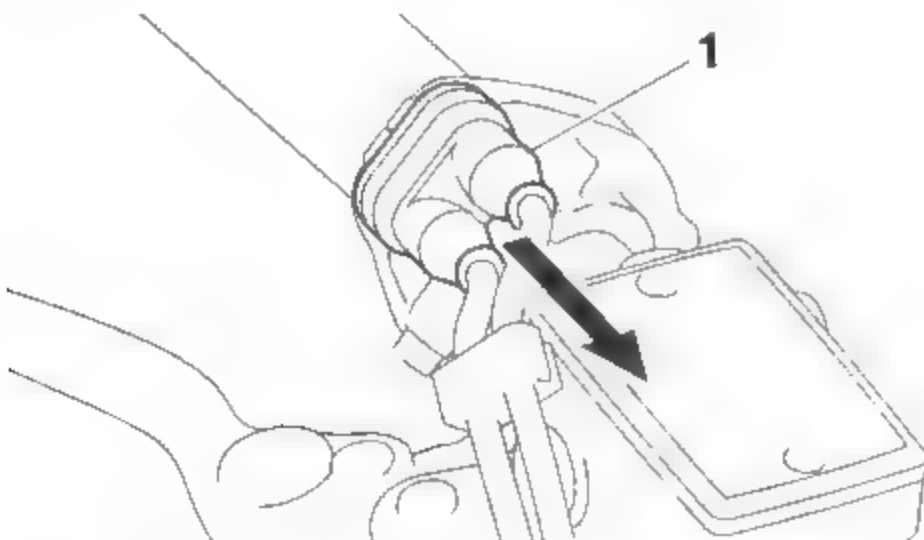


G088916

3. Remove:
 - Throttle cable housings

TIP

While removing the throttle cable housing, pull back the rubber cover "1".



EAS30204

CHECKING THE HANDLEBAR

1. Check:
 - Handlebar

Bends/cracks/damage → Replace.

EWA13690

WARNING

Do not attempt to straighten a bent handlebar as this may dangerously weaken it.

EAS30205

INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13130

WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Install:
 - Lower handlebar holder "1"
 - Handlebar "2"
 - Upper handlebar holder "3"



Lower handlebar holder nut
32 N·m (3.2 kgf·m, 24 lb·ft)

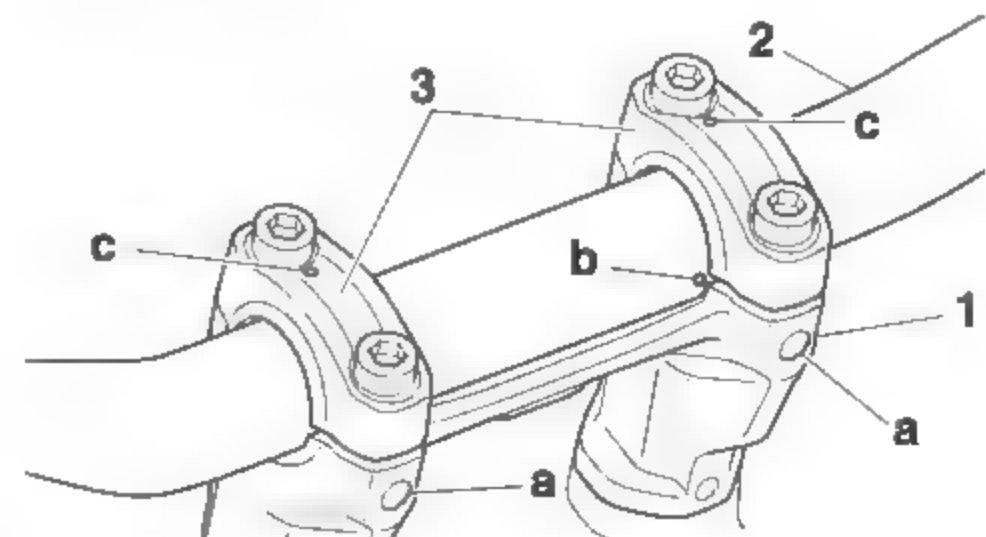
ECA19130

NOTICE

- First, tighten the bolts on the front side of the upper handlebar holder, and then on the rear side.
- Turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.

TIP

- The lower handlebar holder should be installed with the projections "a" facing rearward.
- Align the punch mark "b" on the handlebar with the right inner side of the lower handlebar holder.
- The upper handlebar holders should be installed with the punch marks "c" facing forward.
- Tighten the upper handlebar holder bolts less than 20 N·m (2.0 kgf·m, 15 lb·ft) temporarily, and adjust the handlebar position.



3. Tighten:
 - Upper handlebar holder bolt



Upper handlebar holder bolt
28 N·m (2.8 kgf·m, 21 lb·ft)

ECA19130

NOTICE

- First, tighten the bolts on the front side of the upper handlebar holder, and then on the rear side.
- Turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.

4. Install:

- Front brake master cylinder
Refer to "INSTALLING THE FRONT BRAKE MASTER CYLINDER" on page 4-35.

5. Install:

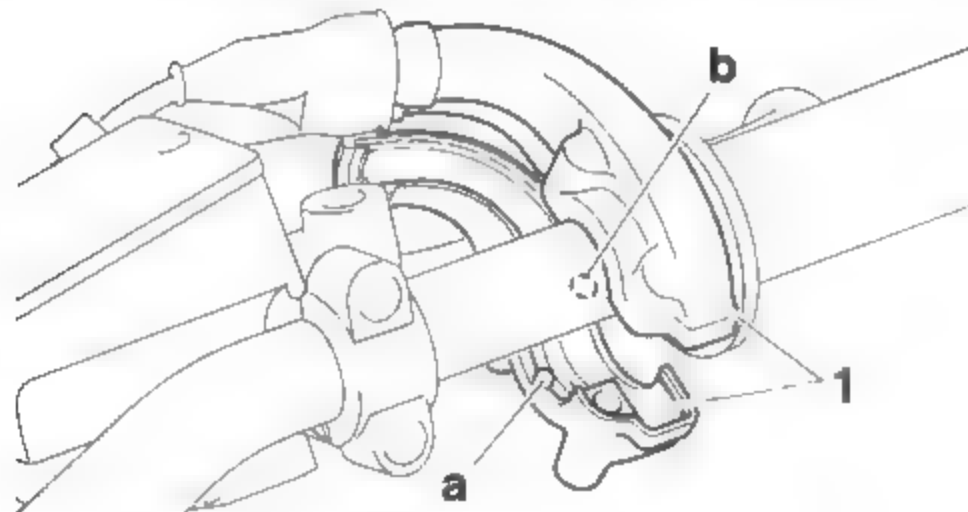
- Throttle grip
- Throttle cables
- Throttle cable housing "1"



Throttle cable housing bolt
2.3 N·m (0.23 kgf·m, 1.7 lb·ft)

TIP

Align the projection "a" on the throttle cable housing with the hole "b" in the handlebar.



6. Install:

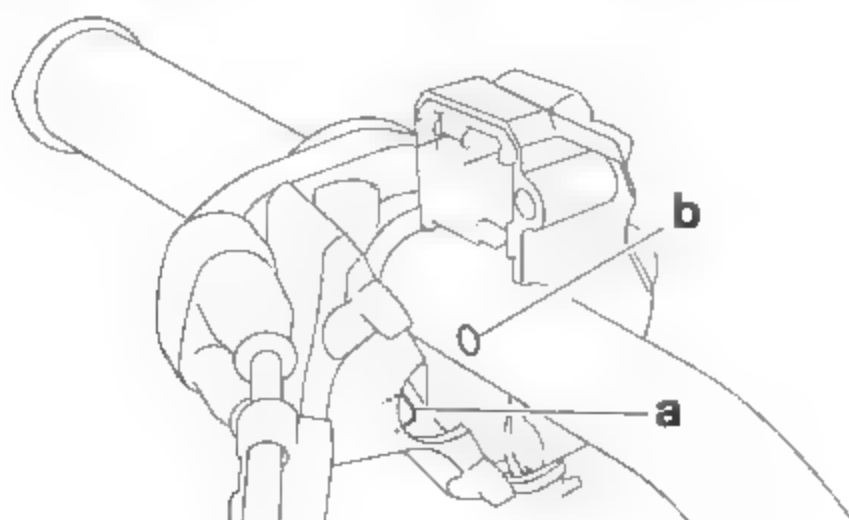
- Handlebar switch (right)



Handlebar switch screw (right)
3.5 N·m (0.35 kgf·m, 2.6 lb·ft)

TIP

Align the projection "a" on the handlebar switch (right) with the hole "b" in the handlebar.



7. Install:

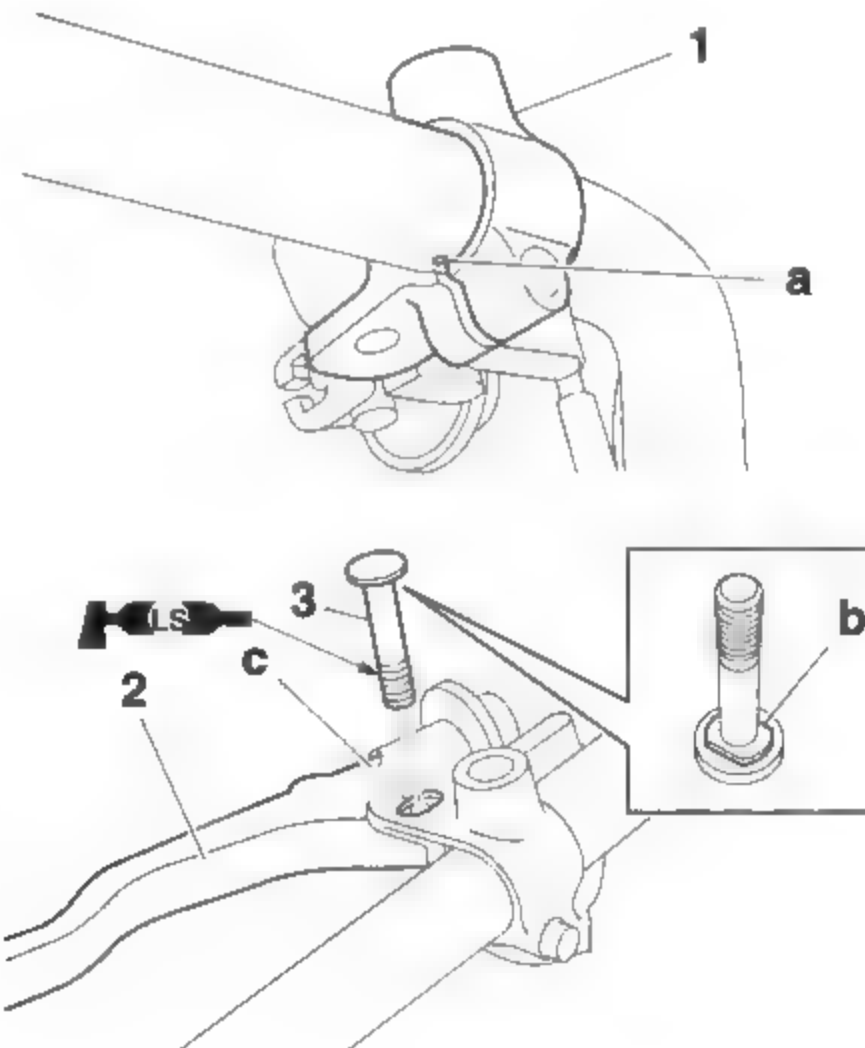
- Clutch lever holder "1"
- Clutch lever "2"
- Clutch lever pivot bolt "3"
- Clutch cable
- Clutch switch "4"

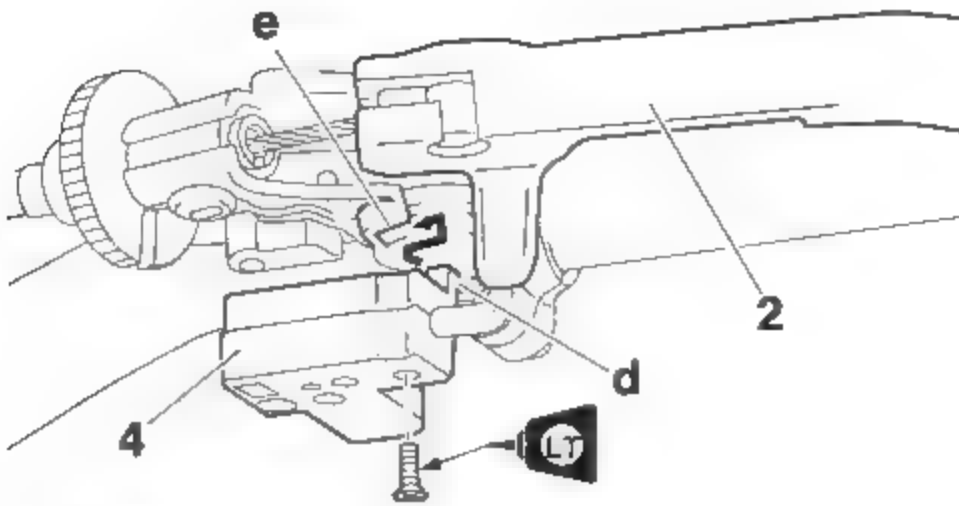


Clutch lever holder pinch bolt
11 N·m (1.1 kgf·m, 8.1 lb·ft)
Clutch lever pivot nut
7 N·m (0.7 kgf·m, 5.2 lb·ft)

TIP

- Align the center of slit on the clutch lever holder with the punch mark "a" on the handlebar as shown in the illustration.
- Lubricate the clutch lever pivot bolt and nut with the lithium-soap-based grease.
- Fit the projection "b" on the bottom of the bolt head into the slot "c" in the bolt hole in the clutch lever holder.
- While squeezing the clutch lever, fit the projection "d" on the clutch switch into the slot "e" in the clutch lever holder.





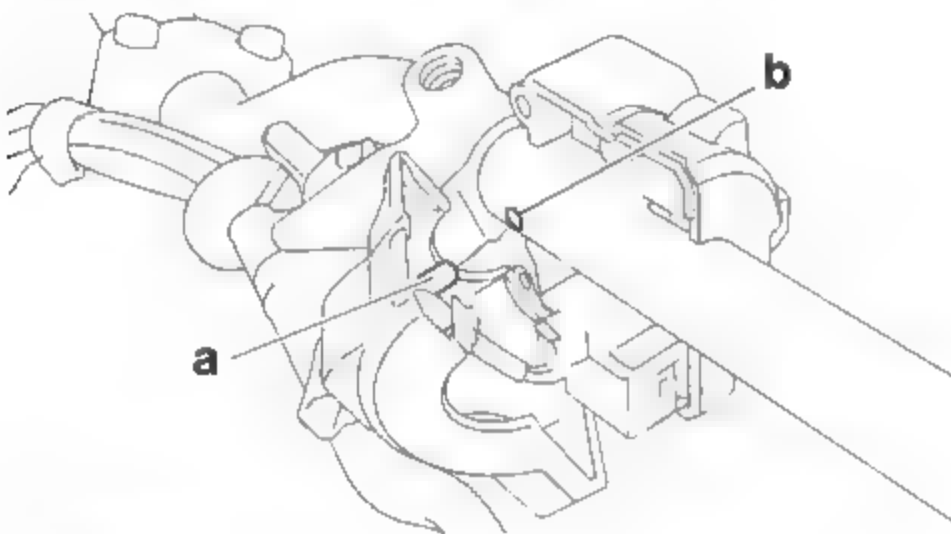
8. Install:
- Handlebar switch (left)



Handlebar switch screw (left)
2.0 N·m (0.20 kgf·m, 1.5 lb·ft)

TIP

Align the projection "a" on the left handlebar switch with the hole "b" in the handlebar.



9. Install:
- Handlebar grip
 - Grip end (left) "1"



Grip end
26 N·m (2.6 kgf·m, 19 lb·ft)

- Apply a thin coat of rubber adhesive onto the end of the handlebar.
- Slide the handlebar grip over the end of the handlebar.
- Wipe off any excess rubber adhesive with a clean rag.

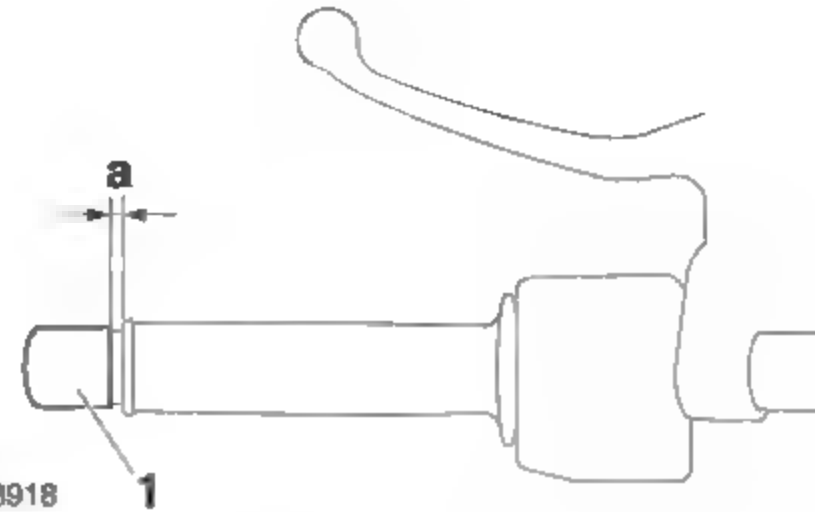
EWA13700

WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.

TIP

There should be 1–6 mm (0.04–0.24 in) of clearance "a" between the handlebar grip and the grip end.



G088918

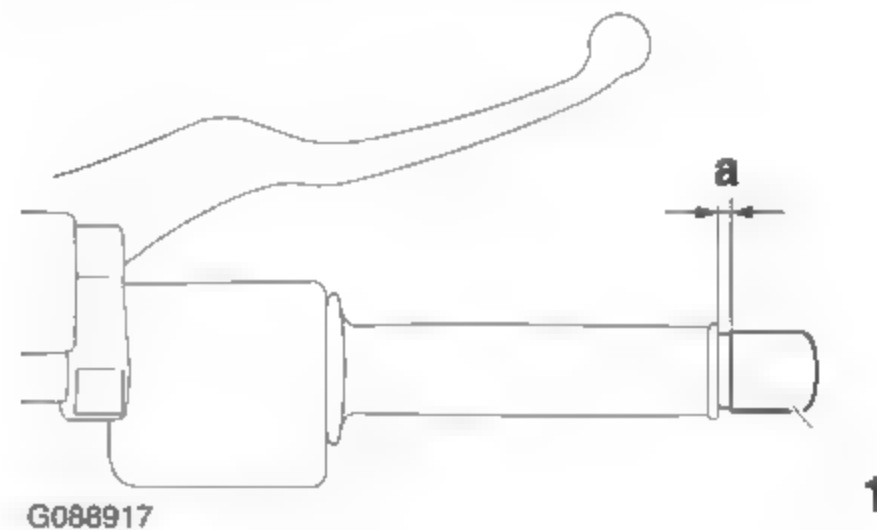
10. Install:
- Grip end (right) "1"



Grip end
26 N·m (2.6 kgf·m, 19 lb·ft)

TIP

There should be 1–6 mm (0.04–0.24 in) of clearance "a" between the throttle grip and the grip end.

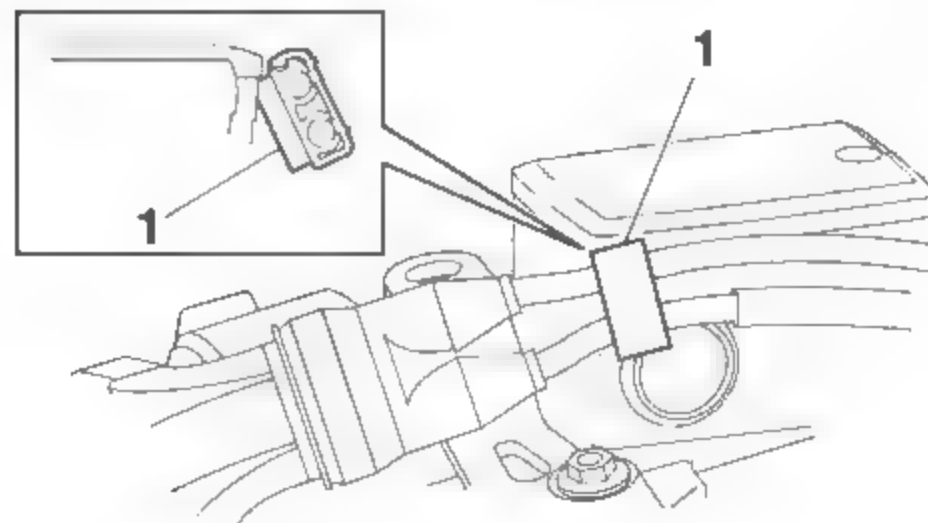


G088917

11. Install:
- Throttle cable holder "1"

TIP

Align the throttle cable holder "1" with the edge of the front brake master cylinder.



12. Adjust:
- Throttle grip free play
Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-30.



Throttle grip free play
3.0–5.0 mm (0.12–0.20 in)

13.Adjust:

- Clutch lever free play
Refer to "ADJUSTING THE CLUTCH LEVER
FREE PLAY" on page 3-13.



Clutch lever free play
5.0–10.0 mm (0.20–0.39 in)

14.Install:

- Handguard brackets
- Rearview mirrors
- Handguards
(temporarily)

15.Tighten:

- Rearview mirrors
- Handguard bolts

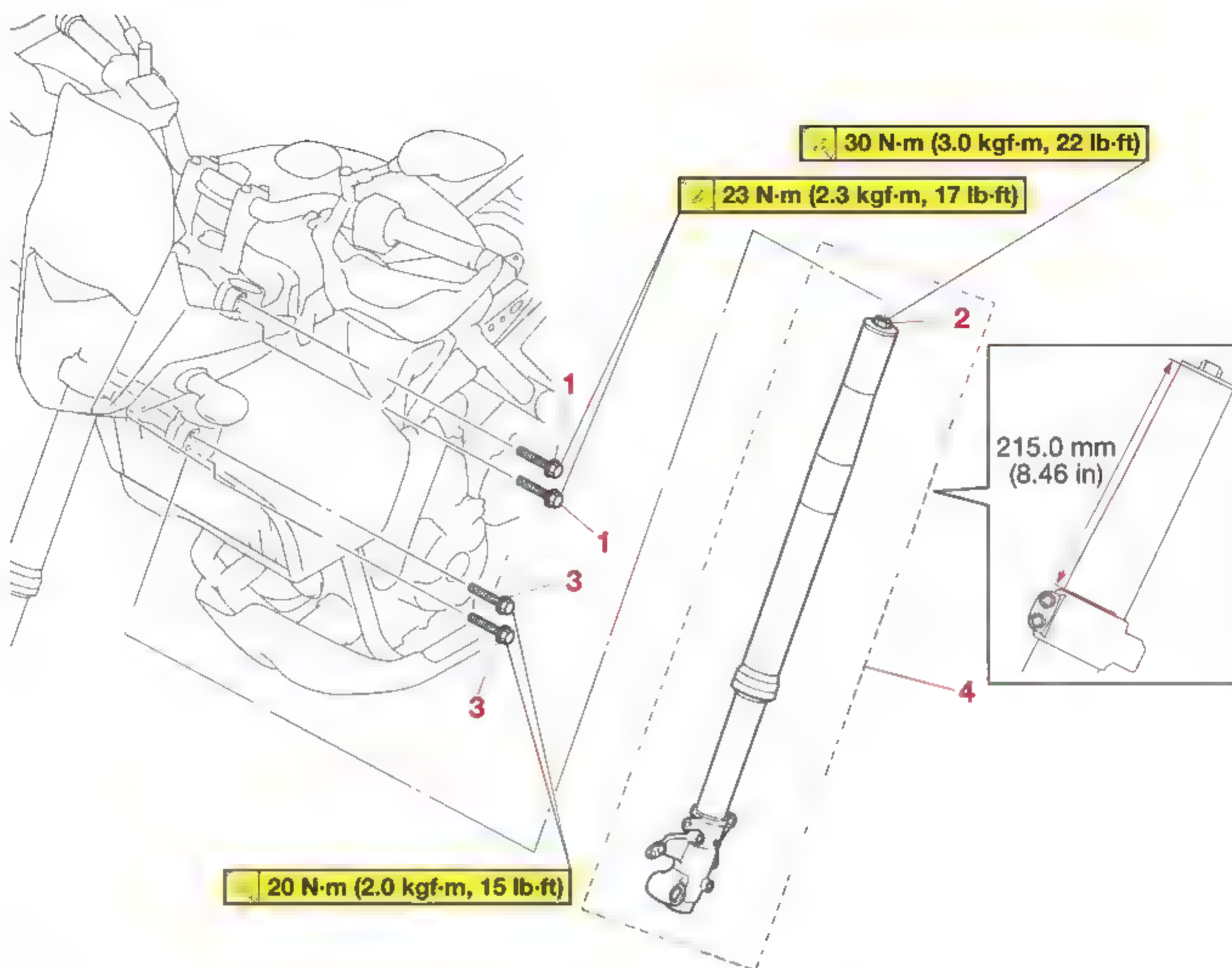


Rearview mirror (left)
17 N·m (1.7 kgf·m, 13 lb·ft)
Rearview mirror (right)
17 N·m (1.7 kgf·m, 13 lb·ft)
Left-hand threads
Handguard bolt (grip end)
18 N·m (1.8 kgf·m, 13 lb·ft)
Handguard bolt (rearview mirror)
8 N·m (0.8 kgf·m, 5.9 lb·ft)
LOCTITE®

EAS20034

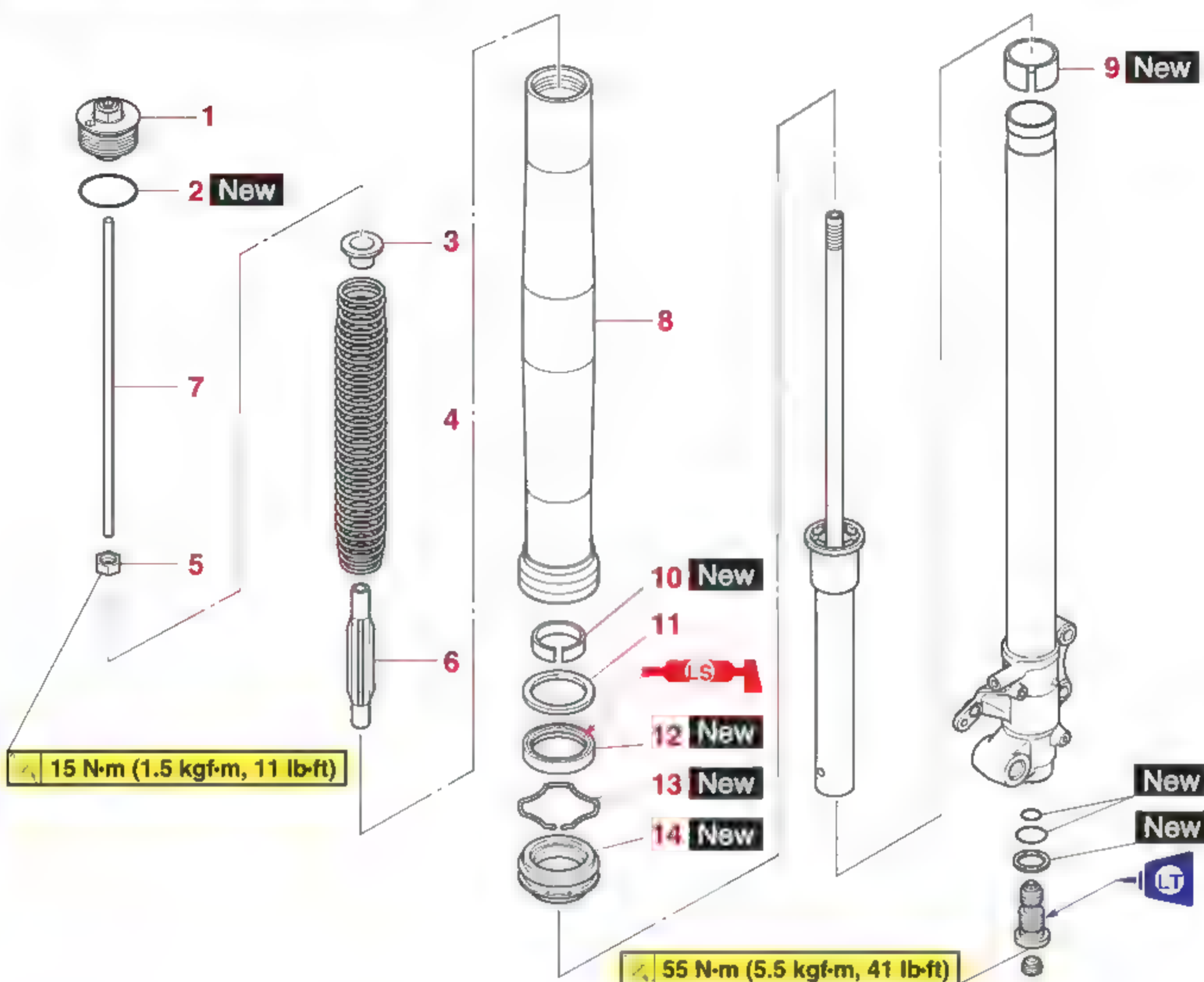
FRONT FORK

Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
	Front brake calipers/Front fender/Front wheel		The following procedure applies to both of the front fork legs.
	Front brake calipers/Front fender/Front wheel		Refer to "FRONT WHEEL" on page 4-11.
1	Upper bracket pinch bolt	2	Loosen.
2	Front fork cap bolt	1	Loosen.
3	Lower bracket pinch bolt	2	Loosen.
4	Front fork leg	1	

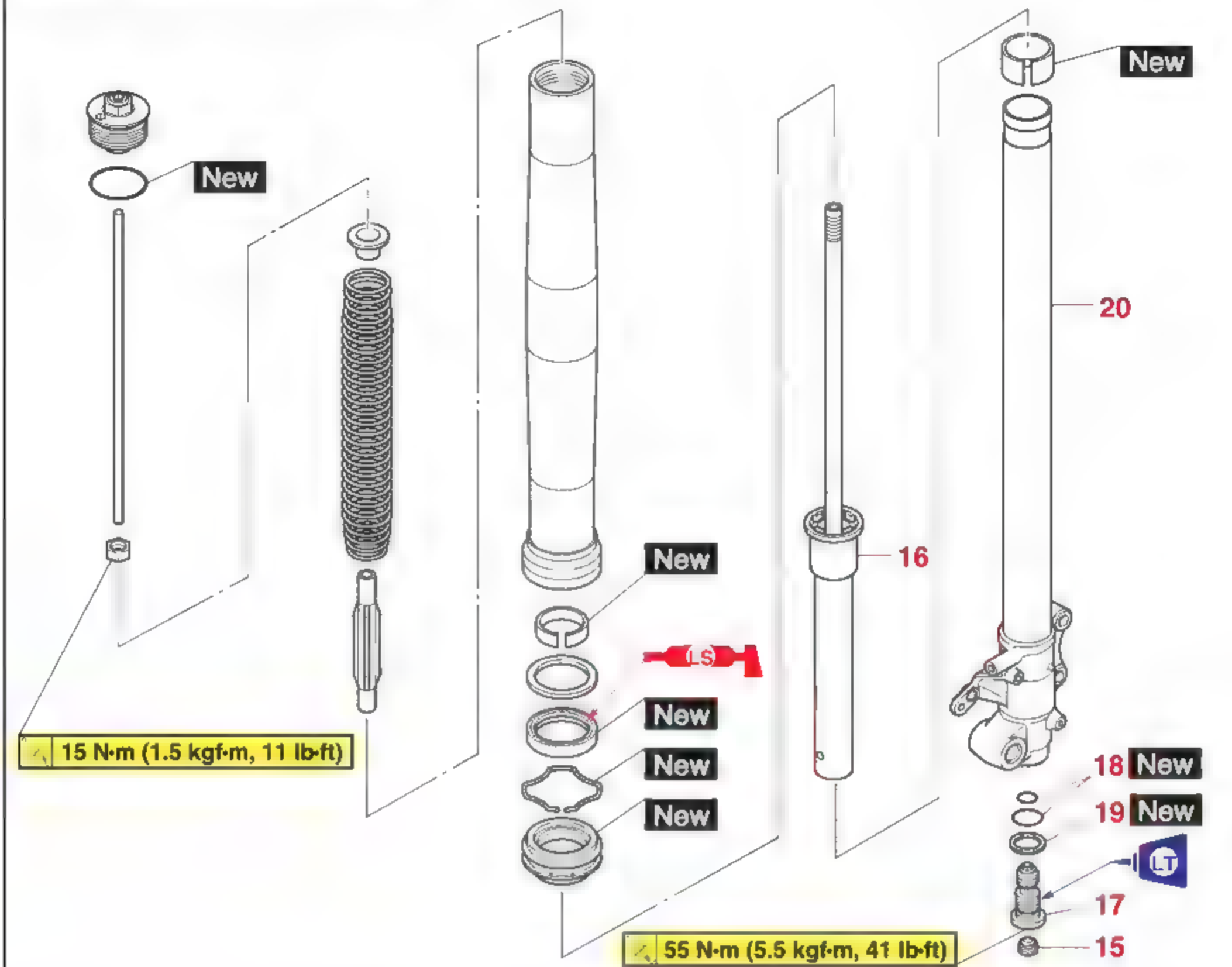
Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
1	Cap bolt	1	
2	O-ring	1	
3	Fork spring seat	1	
4	Fork spring	1	
5	Damper rod locknut	1	
6	Fork spring guide	1	
7	Damper adjusting rod	1	
8	Outer tube	1	
9	Inner tube bushing	1	
10	Outer tube bushing	1	
11	Washer	1	
12	Oil seal	1	
13	Oil seal clip	1	
14	Dust seal	1	

FRONT FORK

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
15	Cap	1	
16	Damper rod assembly	1	
17	Damper rod assembly bolt	1	
18	O-ring	2	
19	Copper washer	1	
20	Inner tube	1	

EAS31848

REMOVING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Stand the vehicle on a level surface.

EWA13120

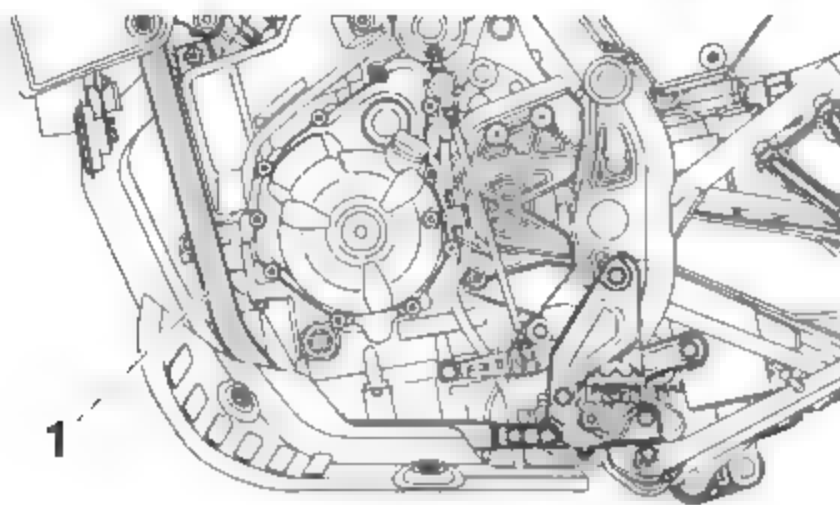


Securely support the vehicle so that there is no danger of it falling over.

ECA27170

NOTICE

Down tubes "1" are not designed to lift the vehicle. Do not lift the vehicle with a jack-up stand by putting it under the down tubes.

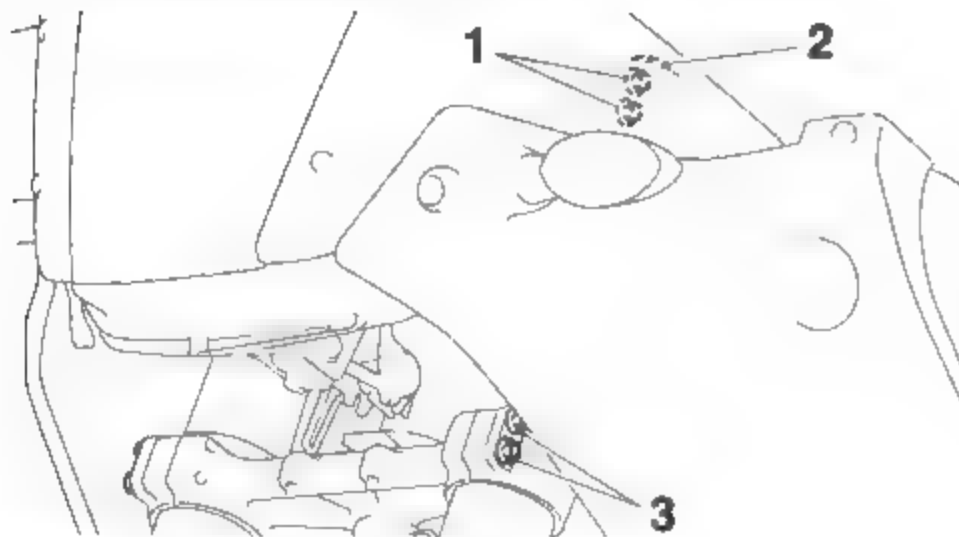


TIP

Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Loosen:

- Upper bracket pinch bolts "1"
- Front fork cap bolt "2"
- Lower bracket pinch bolts "3"



EWA13640



Before loosening the upper and lower bracket pinch bolts, support the front fork leg.

3. Remove:

- Front fork leg

EAS30207

DISASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Remove:

- Cap bolt "1"
(from the damper rod assembly)
- Locknut "2"
- Fork spring seat "3"
- Fork spring
 - a. Press down on the fork spring with the fork spring compression tool "4".
 - b. Install the rod holder "5" between the locknut "2" and the fork spring seat "3".



**Fork spring compression tool
90890-01573**

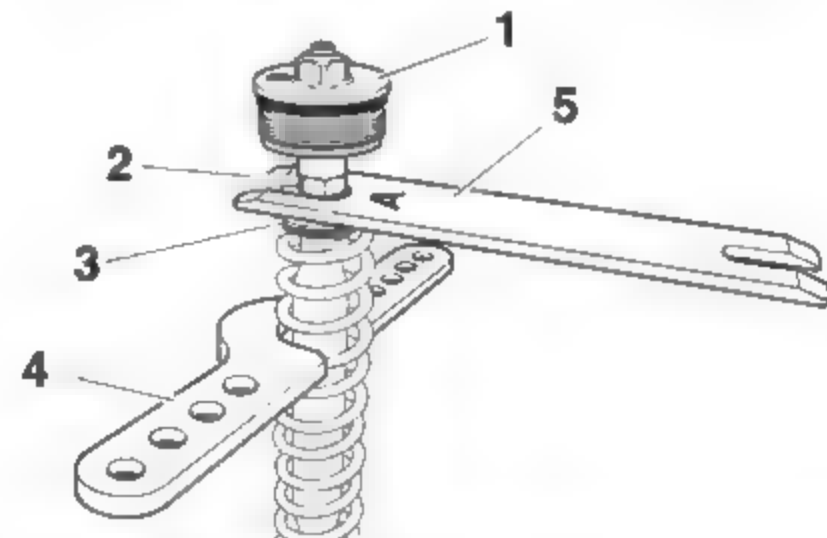
**Fork spring compression tool
YM-01573**

**Rod holder
90890-01434**

**Damper rod holder double ended
YM-01434**

TIP

Use the side of the rod holder that is marked "A".



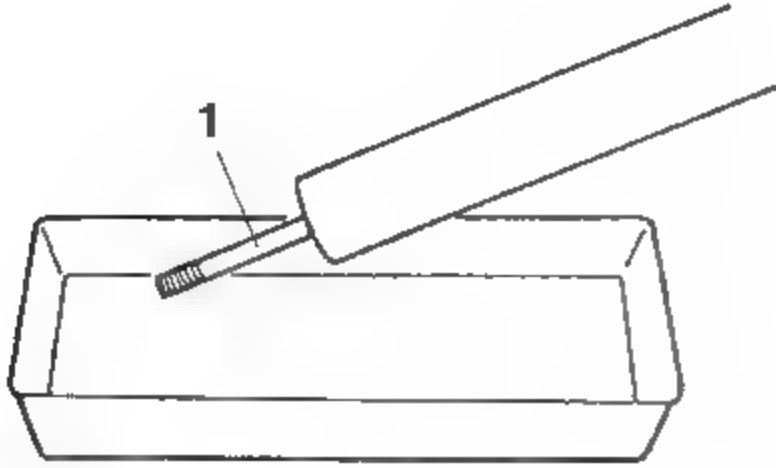
- c. Hold the locknut and remove the cap bolt.
- d. Remove the rod holder and fork spring compression tool.
- e. Remove the fork spring seat and locknut.
- f. Remove the fork spring and fork spring guide.

2. Drain:

- Fork oil

TIP

Stroke the damper rod assembly "1" several times while draining the fork oil.



G088919

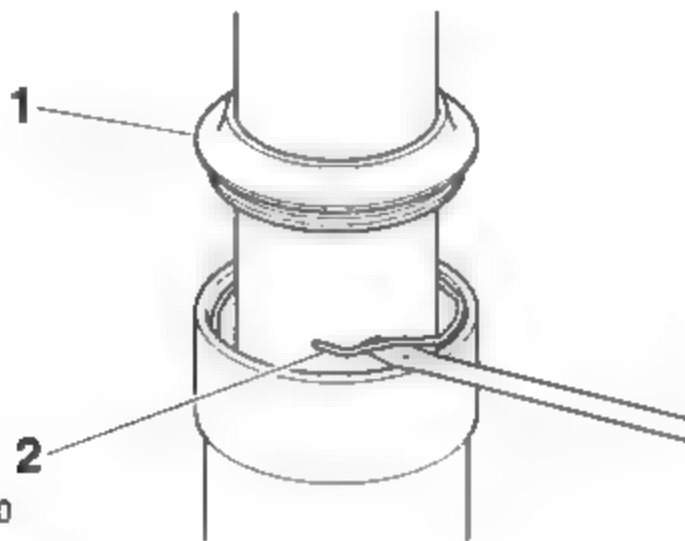
3. Remove:

- Dust seal "1"
 - Oil seal clip "2"
- (with a flat-head screwdriver)

ECA14180

NOTICE

Do not scratch the inner tube.



G088920

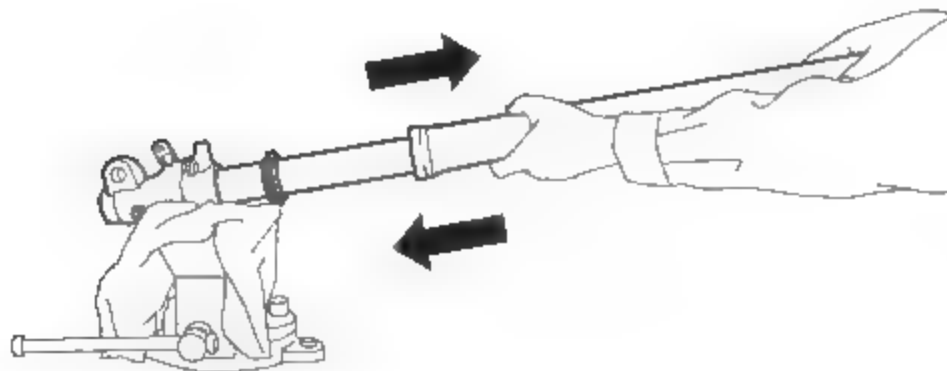
4. Remove:

- Outer tube
 - a. Hold the front fork leg horizontally.
 - b. Securely clamp the brake caliper bracket in a vise with soft jaws.
 - c. Separate the outer tube from the inner tube by pulling the outer tube forcefully but carefully.

ECA19880

NOTICE

Excessive force will damage the bushings. Damaged bushings must be replaced.



5. Remove:

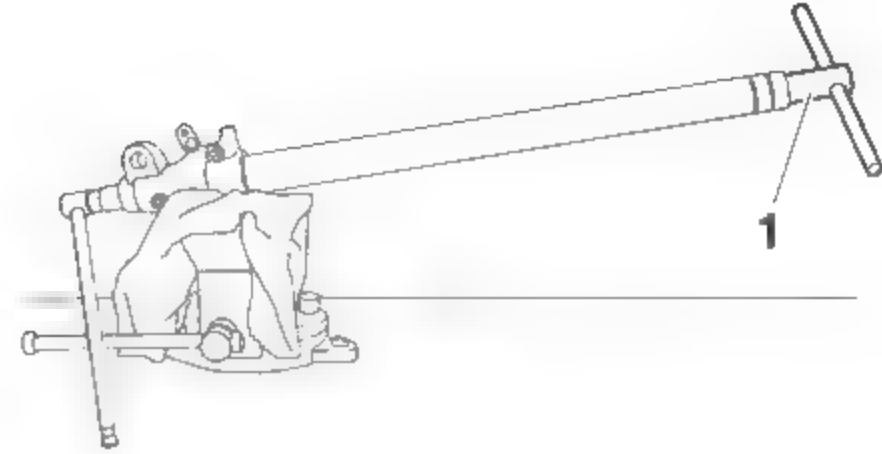
- Damper rod assembly bolt
- Damper rod assembly

TIP

While holding the damper rod with the damper rod holder "1", loosen the damper rod assembly bolt.



Damper rod holder (ø27)
90890-01423
Damping rod holder
YM-01423



EAS30208

CHECKING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Check:

- Inner tube
 - Outer tube
- Bends/damage/scratches → Replace.

EWA13850

WARNING

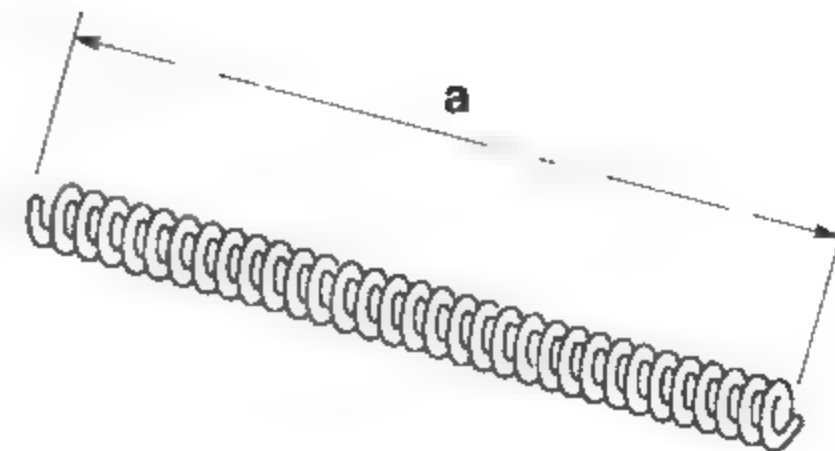
Do not attempt to straighten a bent inner tube as this may dangerously weaken it.

2. Measure:

- Fork spring free length "a"
- Out of specification → Replace.



Fork spring free length limit
413.5 mm (16.28 in)



G088921

3. Check:

- Damper rod assembly
- Damage/wear → Replace.

Obstruction → Blow out all of the oil passages with compressed air.

ECA19110

NOTICE

- The front fork leg has a very sophisticated internal construction, which are particularly sensitive to foreign material.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

EAS30209

ASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

EWA18380

WARNING

If both front fork legs are not filled with the specified amount of the fork oil, it may cause poor handling and a loss of stability.

TIP

- When assembling the front fork leg, be sure to replace the following parts:
 - Inner tube bushing
 - Outer tube bushing
 - Oil seal
 - Oil seal clip
 - Dust seal
 - Copper washer
 - O-rings
- Before assembling the front fork leg, make sure all of the components are clean.

1. Install:

- Damper rod assembly

ECA22560

NOTICE

Allow the damper rod assembly to slide slowly down the inner tube. Be careful not to damage the inner tube.

2. Tighten:

- Damper rod assembly bolt
(along with the O-rings **New** and the copper washer **New**)



Front fork damper rod assembly bolt

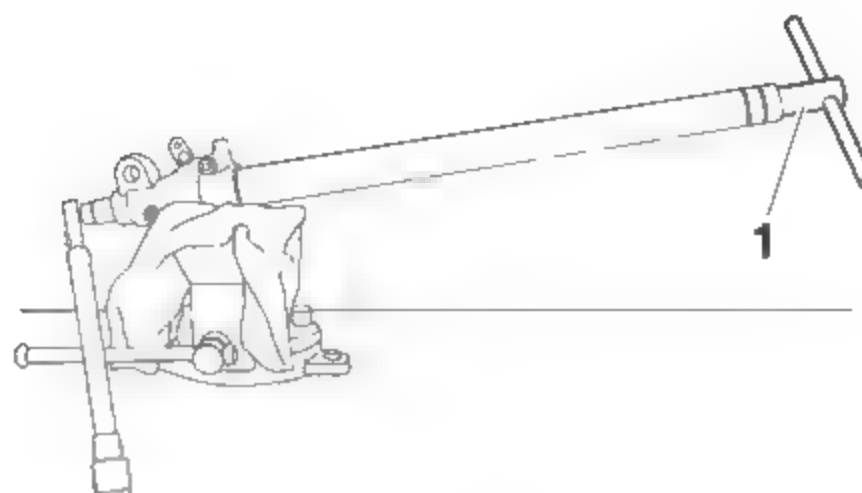
55 N·m (5.5 kgf·m, 41 lb·ft)
LOCTITE®

TIP

While holding the damper rod assembly with the damper rod holder "1", tighten the damper rod assembly bolt.



Damper rod holder (ø27)
90890-01423
Damping rod holder
YM-01423



3. Lubricate:

- Inner tube's outer surface



Recommended oil
Yamaha Suspension Oil 01

4. Install:

- Dust seal "1" **New**
- Oil seal clip "2" **New**
- Oil seal "3" **New**
- Washer "4"
- Outer tube bushing "5" **New**
- Inner tube bushing "6" **New**

ECA19170

NOTICE

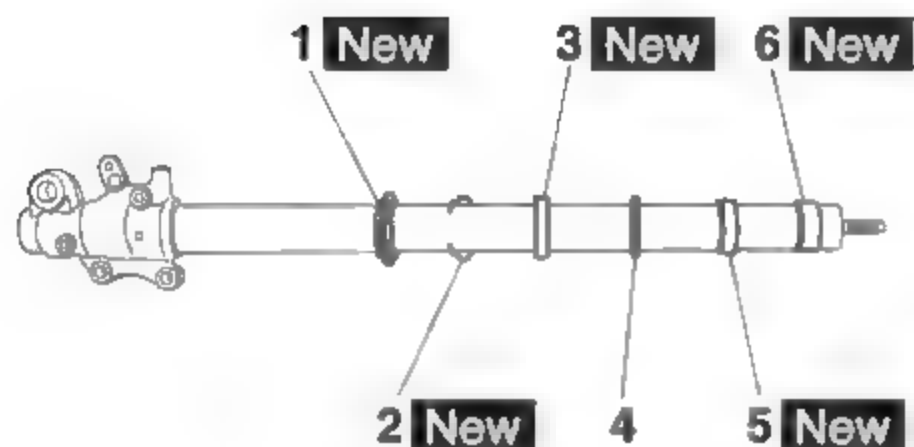
Make sure the numbered side of the oil seal faces bottom side.

TIP

- Before installing the oil seal, lubricate its lips with lithium-soap-based grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.



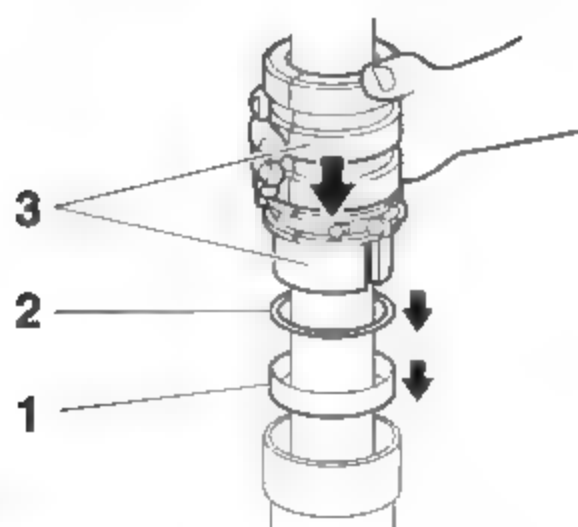
G088922



5. Install:
- Outer tube
(to the inner tube)
6. Install:
- Outer tube bushing "1"
 - Washer "2"
 - (with the fork seal driver "3")



Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442

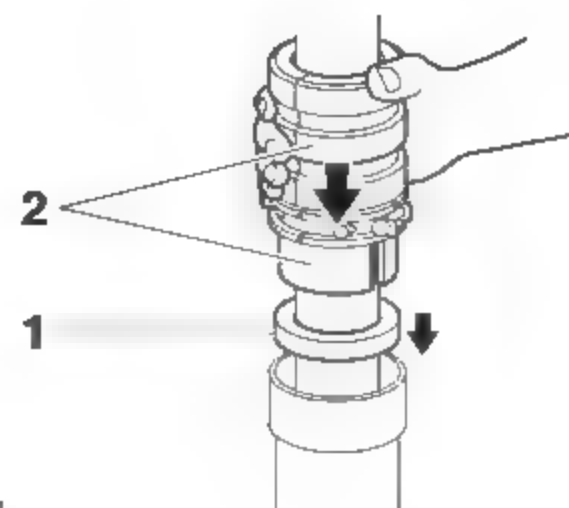


G088923

7. Install:
- Oil seal "1"
 - (with the fork seal driver "2")



Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442

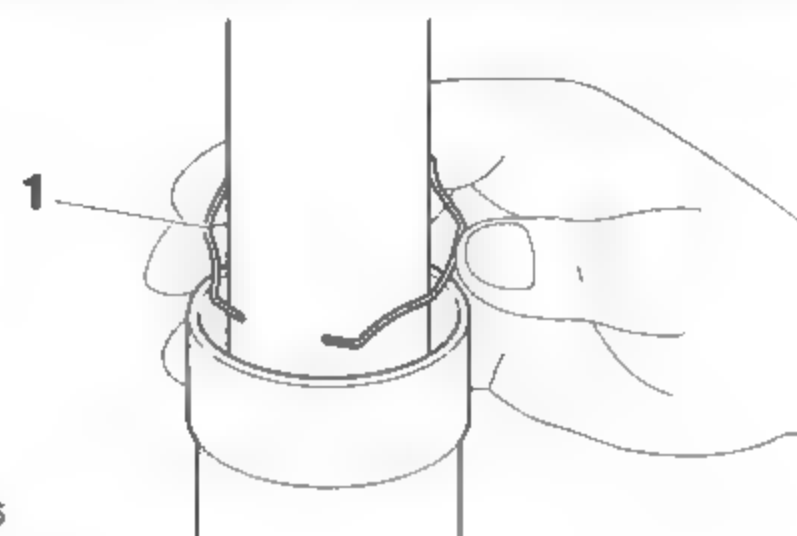


G088924

8. Install:
- Oil seal clip "1"

TIP

Adjust the oil seal clip so that it fits into the outer tube's groove.

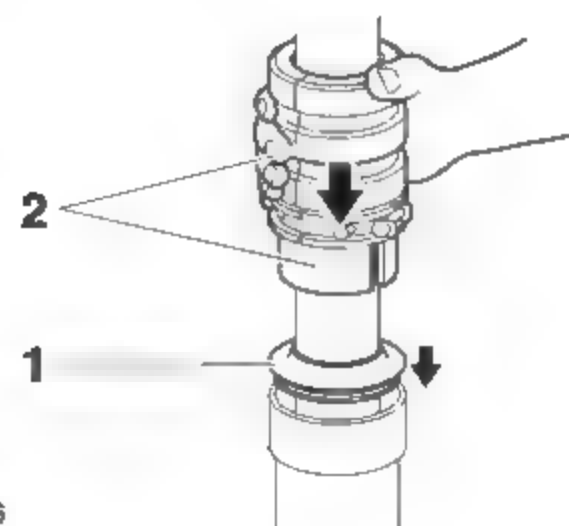


G088925

9. Install:
- Dust seal "1"
 - (with the fork seal driver "2")



Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442



G088926

10. Fill:
- Front fork leg
(with the specified amount of the recommended fork oil)



Recommended oil
Yamaha Suspension Oil 01
Quantity (left)
 624.0 cm³ (21.10 US oz, 22.01 Imp.oz)
Quantity (right)
 624.0 cm³ (21.10 US oz, 22.01 Imp.oz)

ECA14230

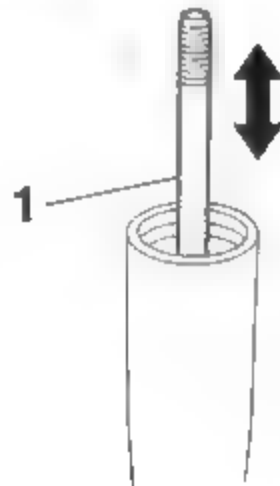
NOTICE

- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

11. After filling the front fork leg, slowly stroke the damper rod "1" up and down (at least ten times) to distribute the fork oil.

TIP

Be sure to stroke the damper rod slowly because the fork oil may spurt out.



12. Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

TIP

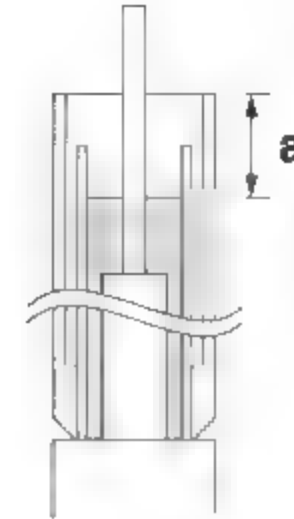
Be sure to bleed the front fork leg of any residual air.

13. Measure:

- Front fork leg oil level "a"
 (from the top of the outer tube, with the outer tube fully compressed and without the fork spring)
 Out of specification → Correct.



Level (left)
 85 mm (3.3 in)
Level (right)
 85 mm (3.3 in)



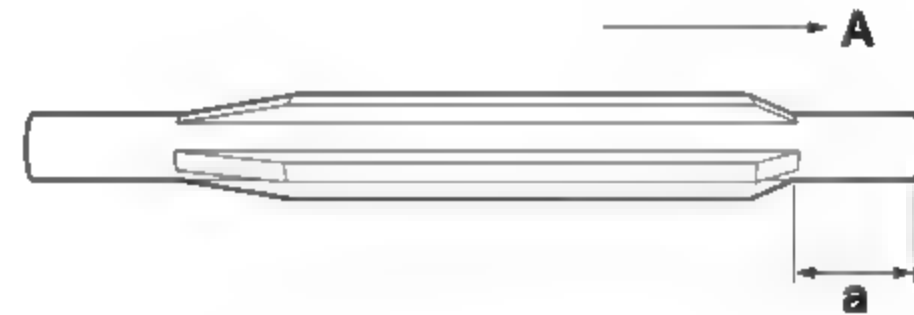
G088930

14. Install:

- Damper adjusting rod
- Fork spring guide
- Locknut
 - Install the fork spring guide.

TIP

Install the fork spring guide with its shorter end "a" pointing up "A".



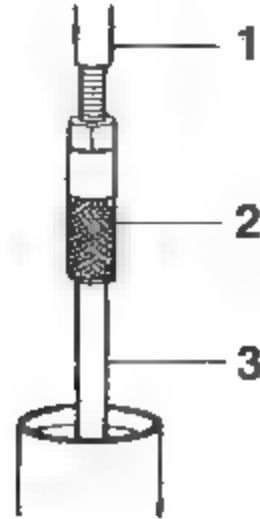
- Install the locknut all the way onto the damper rod assembly.

15. Install:

- Rod puller "1"
- Rod puller attachment (M10 long) "2"
 (onto the damper rod "3")



Rod puller
 90890-01437
Universal damping rod bleeding tool set
 YM-A8703
Rod puller attachment (M10 long)
 90890-01578
Universal damping rod bleeding tool set
 YM-A8703



G088927

16. Install:

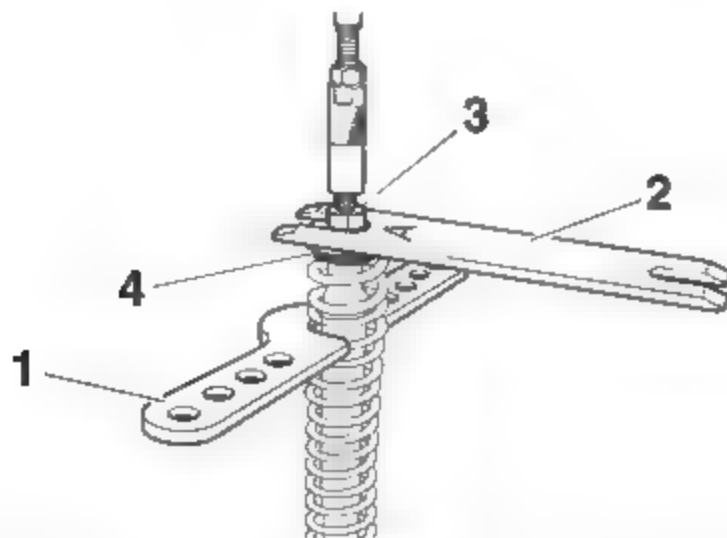
- Fork spring
- Fork spring seat
 - a. Install the fork spring.
 - b. Install the fork spring seat.
 - c. Install the fork spring compression tool "1".
 - d. Press down on the fork spring with the fork spring compression tool "1".
 - e. Pull up the rod puller and install the rod holder "2" between the locknut "3" and the fork spring seat "4".



Fork spring compression tool
90890-01573
Fork spring compression tool
YM-01573
Rod holder
90890-01434
Damper rod holder double ended
YM-01434

TIP

Use the side of the rod holder that is marked "A".



- f. Remove the rod puller and rod puller attachment.
- g. Install the cap bolt, and then finger tighten the cap bolt.

TIP

Tighten the cap bolt until it contacts the end of the damper rod assembly.

CAUTION

WARNING

Always use a new cap bolt O-ring.

- h. Hold the cap bolt and tighten the locknut to specification.



Damper rod locknut
15 N·m (1.5 kgf·m, 11 lb·ft)

- i. Remove the rod holder and fork spring compression tool.

17. Install:

- Cap bolt
 (to the outer tube)

TIP

- Temporarily tighten the cap bolt.
- When to tighten the cap bolt to the specified torque is after installing the front fork leg to the vehicle and tightening the lower bracket pinch bolts.

EAS30210

INSTALLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Install:

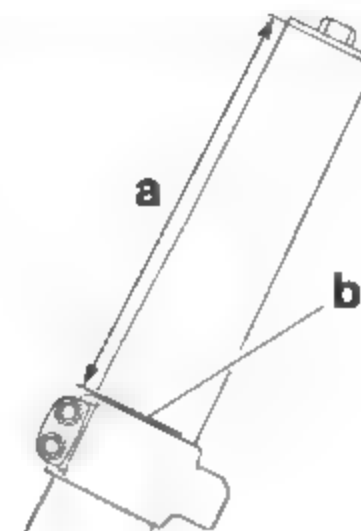
- Front fork leg
 Temporarily tighten the lower bracket pinch bolts.



Installed length (from the top of the outer tube) "a"
215.0 mm (8.46 in)

TIP

Put the mark "b" to specified length, and then install the front fork legs to align the mark "b" with the top of the lower bracket.



2. Tighten:

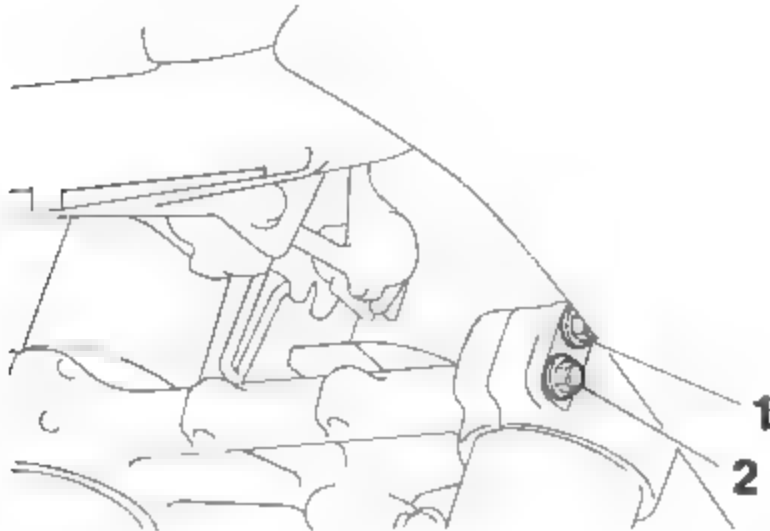
- Lower bracket pinch bolts



Lower bracket pinch bolt
20 N·m (2.0 kgf·m, 15 lb·ft)

TIP

Tighten each bolt to specification in the order
pinch bolt "1" → pinch bolt "2" → pinch bolt "1"
→ pinch bolt "2".

**3. Tighten:**

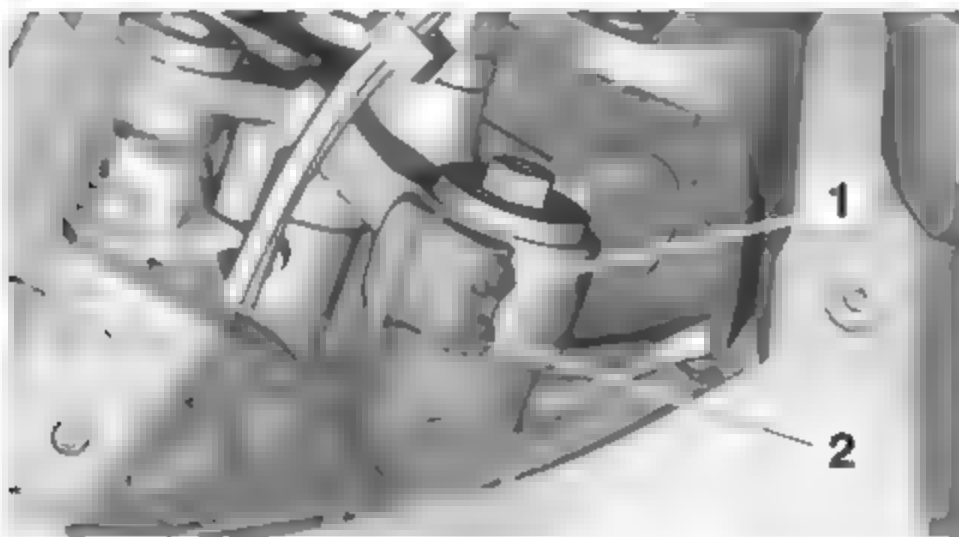
- Front fork cap bolt
- Upper bracket pinch bolt



Front fork cap bolt
30 N·m (3.0 kgf·m, 22 lb·ft)
Upper bracket pinch bolt
23 N·m (2.3 kgf·m, 17 lb·ft)

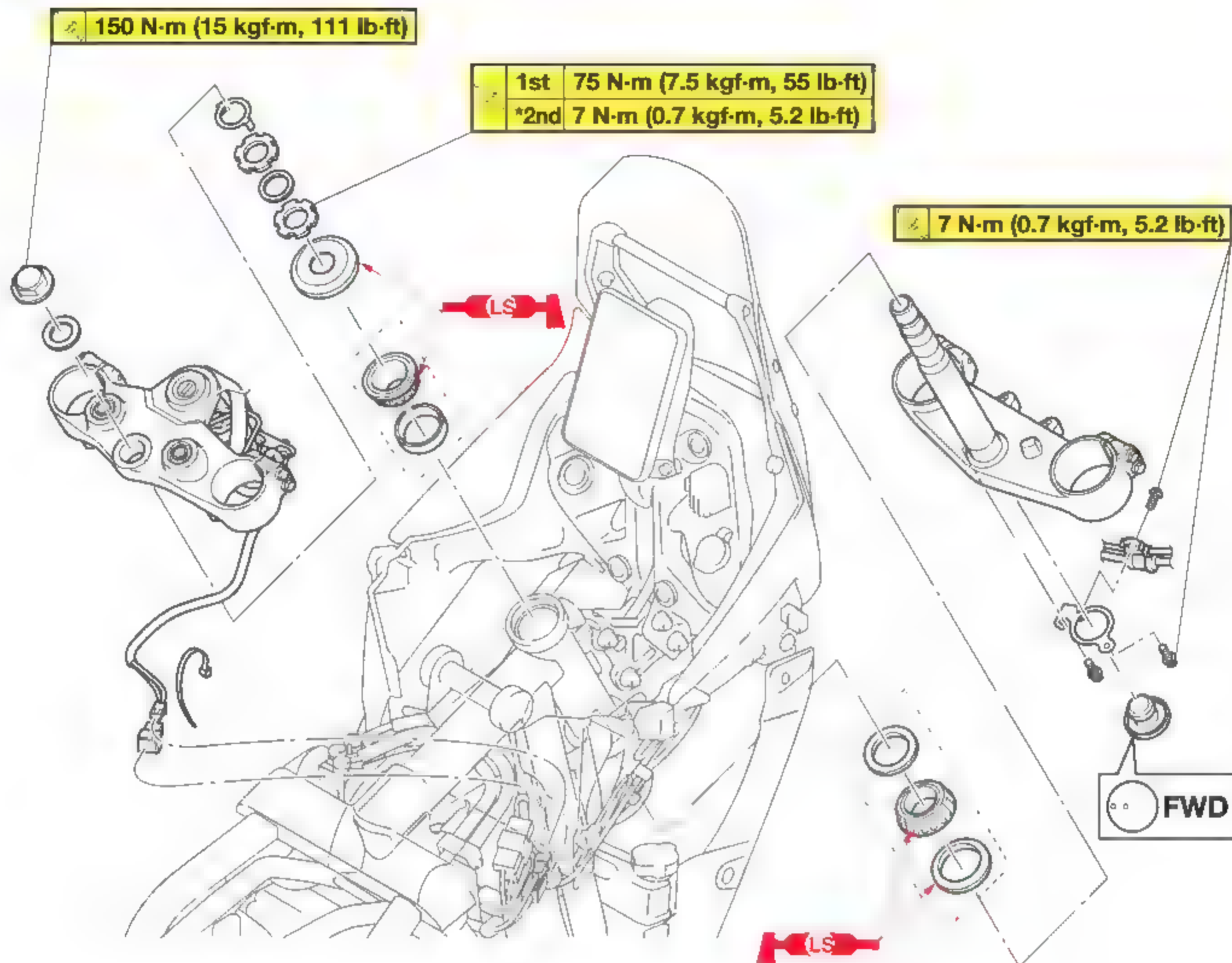
TIP

Tighten the pinch bolt to specification in order
pinch bolt "1" → pinch bolt "2" → pinch bolt "1"
→ pinch bolt "2".



STEERING HEAD

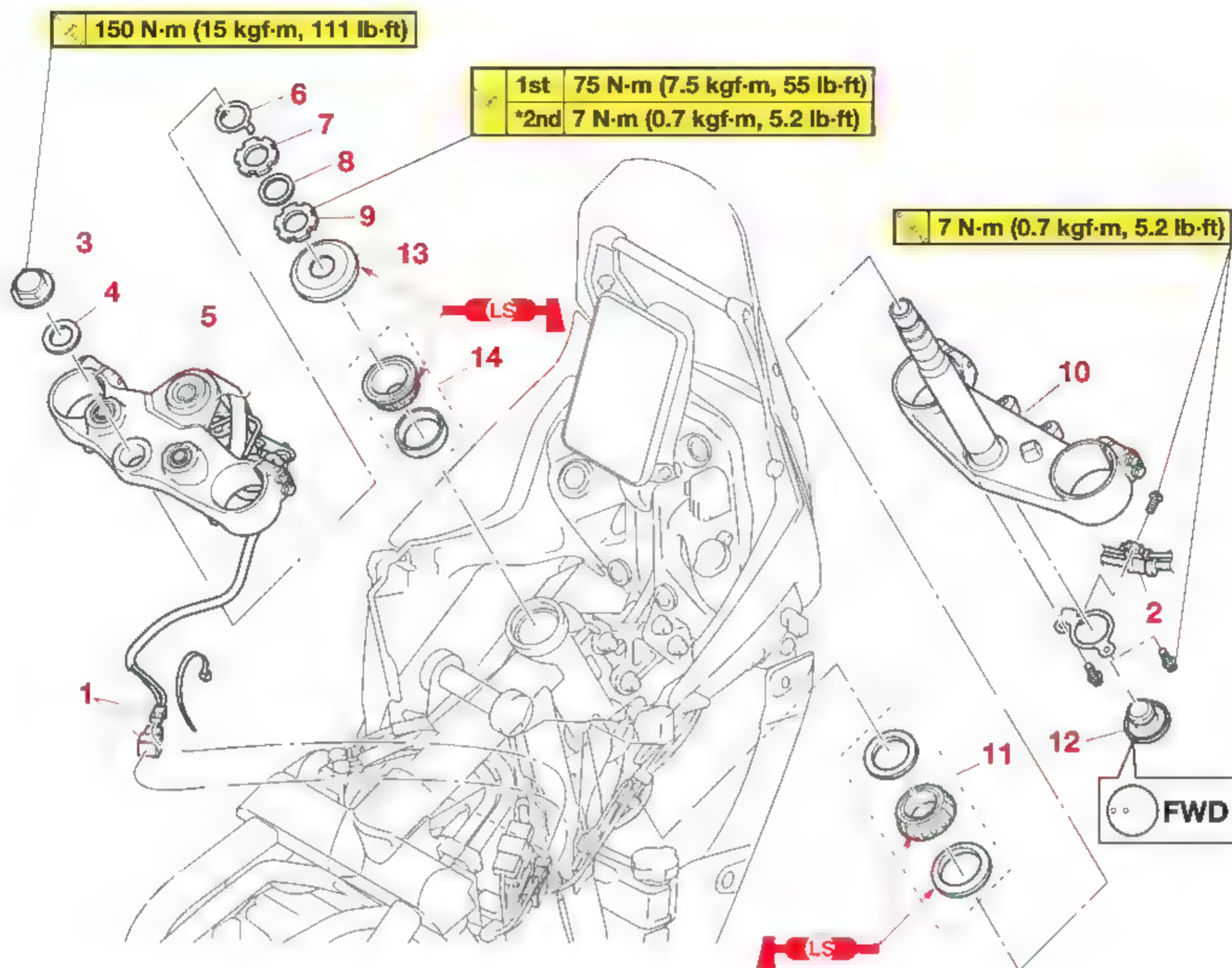
Removing the lower bracket



* Loosen the lower ring nut 165–195°, then tighten the lower ring nut to specification.

Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoops/Air ducts/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Front brake calipers/Front fender/Front wheel		Refer to "FRONT WHEEL" on page 4-11.
	Front fork legs		Refer to "FRONT FORK" on page 4-64.
	Handlebar		Refer to "HANDLEBAR" on page 4-57.

Removing the lower bracket



* Loosen the lower ring nut 165–195°, then tighten the lower ring nut to specification.

Order	Job/Parts to remove	Q'ty	Remarks
1	Main switch coupler	2	Disconnect.
2	Front brake hose/wheel sensor lead holder	1	
3	Steering stem nut	1	
4	Washer	1	
5	Upper bracket	1	
6	Lock washer	1	
7	Upper ring nut	1	
8	Rubber washer	1	
9	Lower ring nut	1	
10	Lower bracket	1	
11	Lower bearing	1	
12	Lower bracket cap	1	
13	Upper bearing cover	1	
14	Upper bearing	1	

EAS30213

REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:

- Upper ring nut "1"
- Rubber washer
- Lower ring nut "2"
- Lower bracket

EWA13730

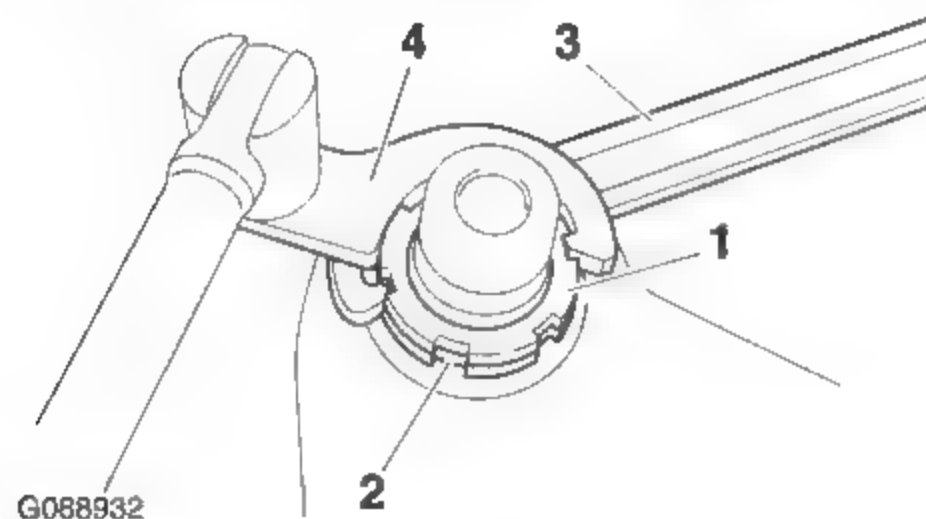
WARNING

Securely support the lower bracket so that there is no danger of it falling.

TIP

- Hold the lower ring nut with ring nut wrench "3", and then remove the upper ring nut with the steering nut wrench "4".
- Remove the lower ring nut with the steering nut wrench.

	Ring nut wrench 90890-01268
	Spanner wrench YU-01268
	Steering nut wrench 90890-01403
	Exhaust flange nut wrench YU-A9472



EAS30214

CHECKING THE STEERING HEAD

1. Wash:

- Bearings
- Bearing races

	Recommended cleaning solvent Kerosene
-------------------------------------------------------------------------------------	------------------------------------------

2. Check:

- Bearings

- Bearing races

Damage/pitting → Replace the bearings and bearing races as a set.

3. Replace:

- Bearings
- Bearing races
 - a. Remove the bearing races from the steering head pipe "1" with a long rod "2" and hammer.
 - b. Remove the bearing race from the lower bracket "3" with a floor chisel "4" and hammer.
 - c. Install a new dust seal and new bearing races.

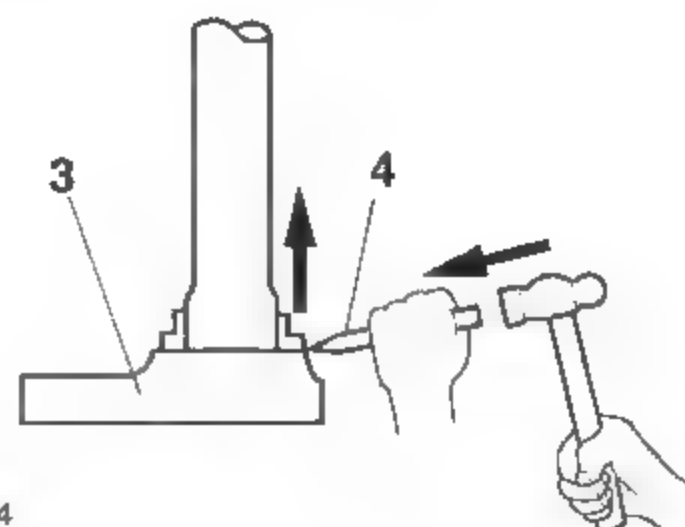
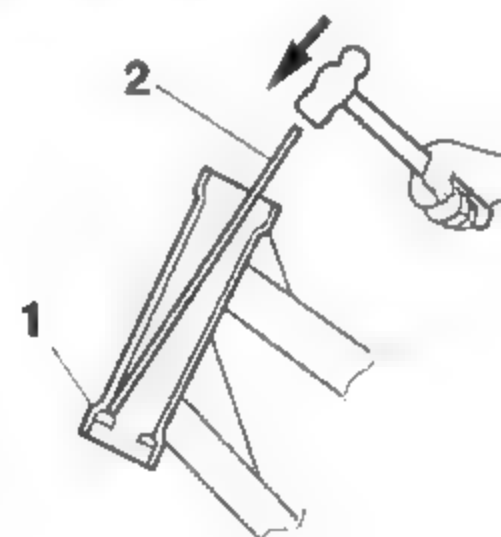
ECA14270

NOTICE

If the bearing race is not installed properly, the steering head pipe could be damaged.

TIP

- Always replace the bearings and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.



4. Check:

- Upper bracket
 - Lower bracket (along with the steering stem)
- Bends/cracks/damage → Replace.

EAS30216

INSTALLING THE STEERING HEAD

1. Lubricate:

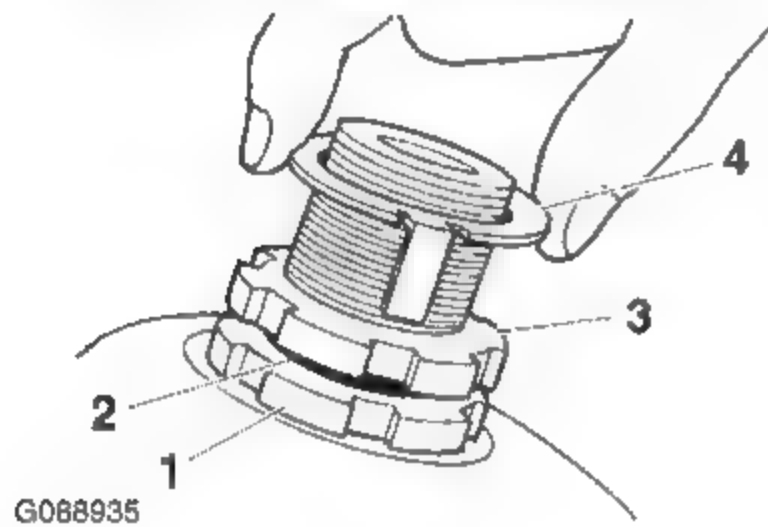
- Upper bearing
- Lower bearing



2. Install:

- Lower ring nut "1"
- Rubber washer "2"
- Upper ring nut "3"
- Lock washer "4"

Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-20.



3. Install:

- Upper bracket
- Washer
- Steering stem nut

TIP

Temporarily tighten the steering stem nut.

4. Install:

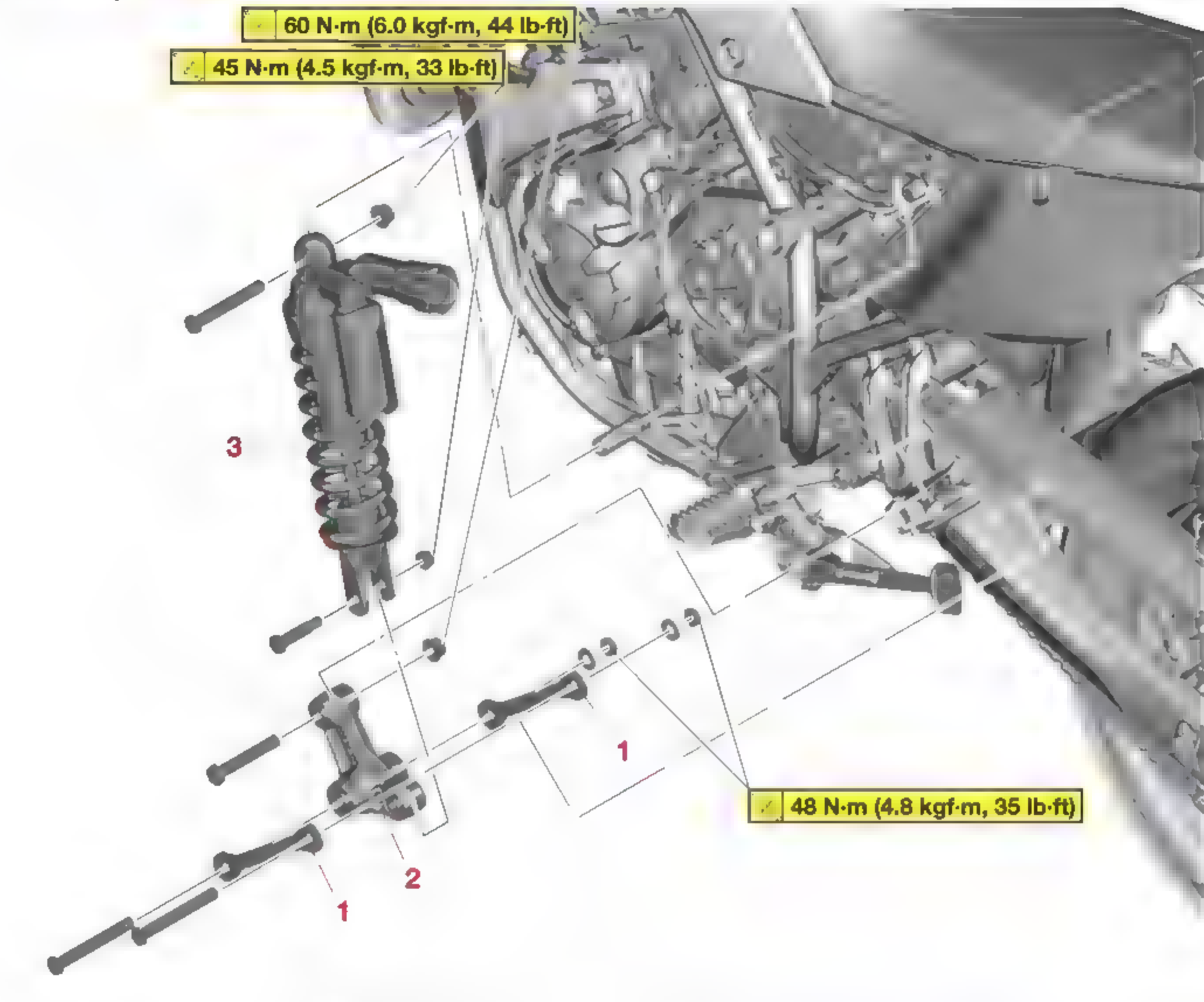
- Front fork legs
- Refer to "INSTALLING THE FRONT FORK LEGS" on page 4-72.

REAR SHOCK ABSORBER ASSEMBLY

EAS20036

REAR SHOCK ABSORBER ASSEMBLY

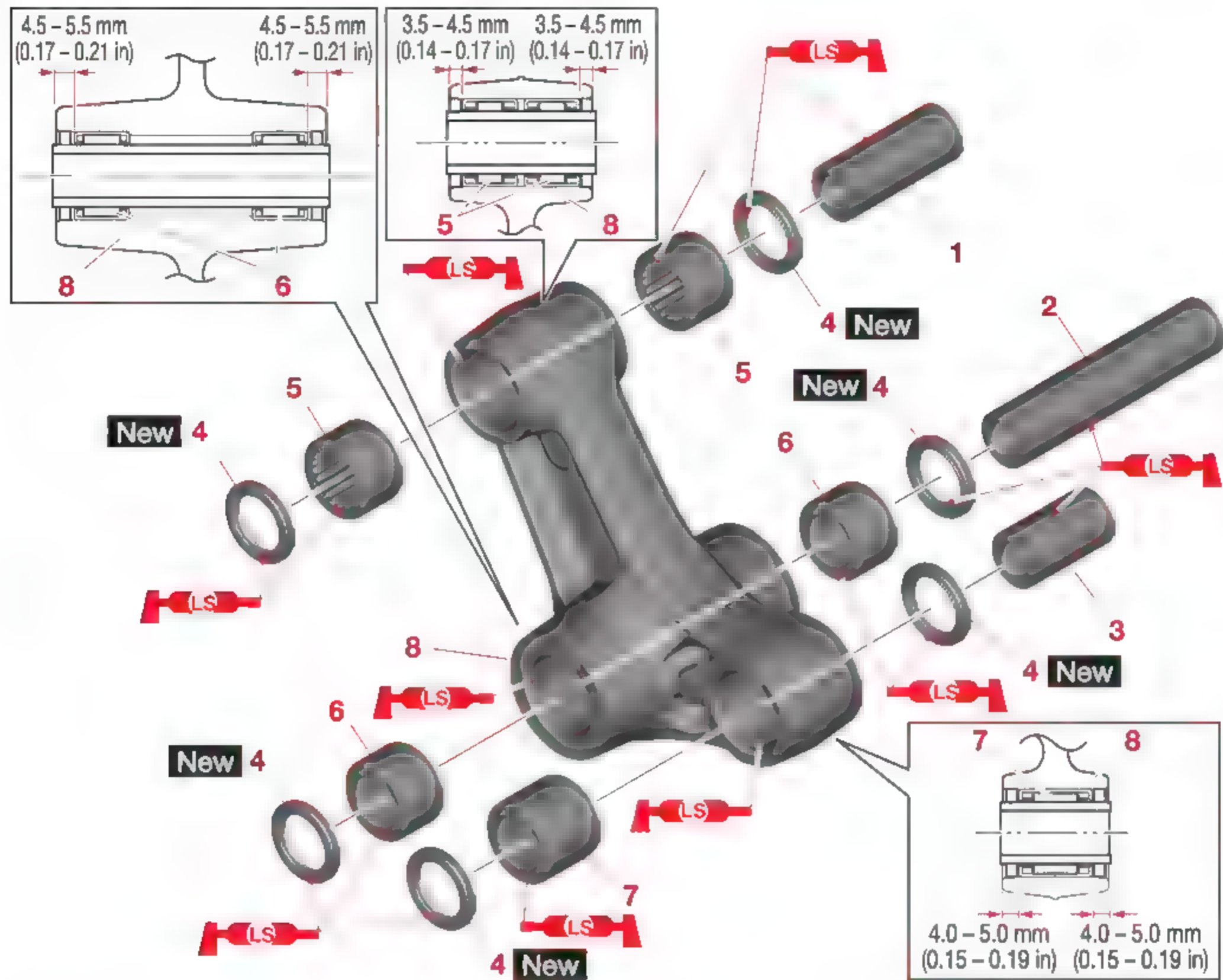
Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Side covers		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-10.
1	Connecting arm	2	
2	Relay arm assembly	1	
3	Rear shock absorber assembly	1	

REAR SHOCK ABSORBER ASSEMBLY

Disassembling the relay arm assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Collar	1	
2	Collar	1	
3	Collar	1	
4	Oil seal	6	
5	Bearing	2	
6	Bearing	2	
7	Bearing	1	
8	Relay arm	1	

REAR SHOCK ABSORBER ASSEMBLY

EAS30828

HANDLING THE REAR SHOCK ABSORBER

EWA13740

WARNING

This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber.

- Do not tamper or attempt to open the rear shock absorber.
- Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.
- Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.

EAS30729

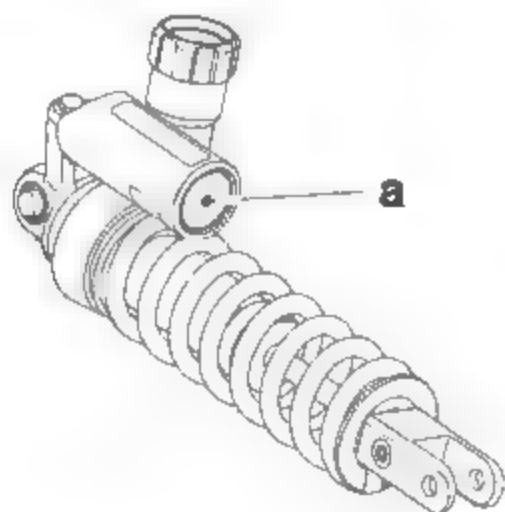
DISPOSING OF A REAR SHOCK ABSORBER

1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3 mm (0.08– 0.12 in) hole through the rear shock absorber at the point “a” as shown.

EWA13780

WARNING

Wear eye protection to prevent eye damage from released gas or metal chips.



EAS30219

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120

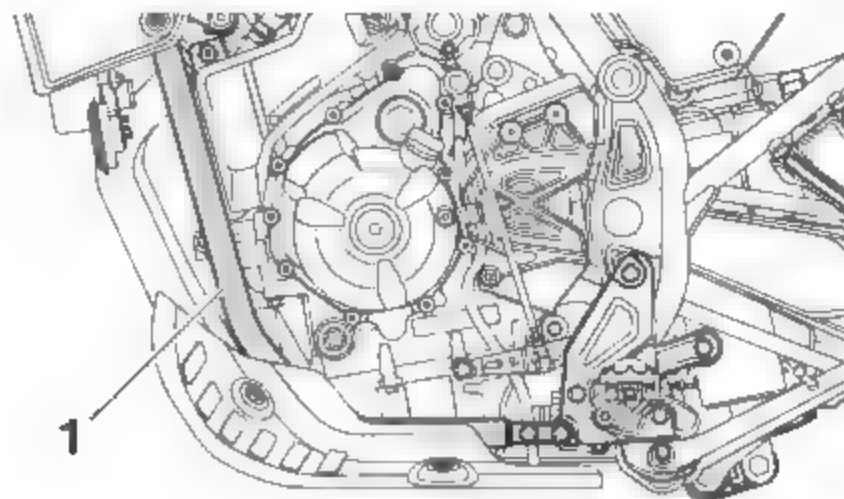
WARNING

Securely support the vehicle so that there is no danger of it falling over.

ECA27170

NOTICE

Down tubes “1” are not designed to lift the vehicle. Do not lift the vehicle with a jack-up stand by putting it under the down tubes.



TIP

Place the vehicle on a suitable stand so that the rear wheel is elevated.

EAS30220

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
 - Rear shock absorber rod
Bends/damage → Replace the rear shock absorber assembly.
 - Rear shock absorber assembly
Gas leaks → Replace the rear shock absorber assembly.
 - Spring
Damage/wear → Replace the rear shock absorber assembly.
 - Bolts
Bends/damage/wear → Replace.

EAS32678

CHECKING THE CONNECTING ARMS AND RELAY ARM

1. Check:
 - Connecting arms
 - Relay arm
Damage/wear → Replace.
2. Check:
 - Bearings
 - Oil seals
Damage → Replace.
3. Check:
 - Collars
Damage/scratches → Replace.

REAR SHOCK ABSORBER ASSEMBLY

EAS30225

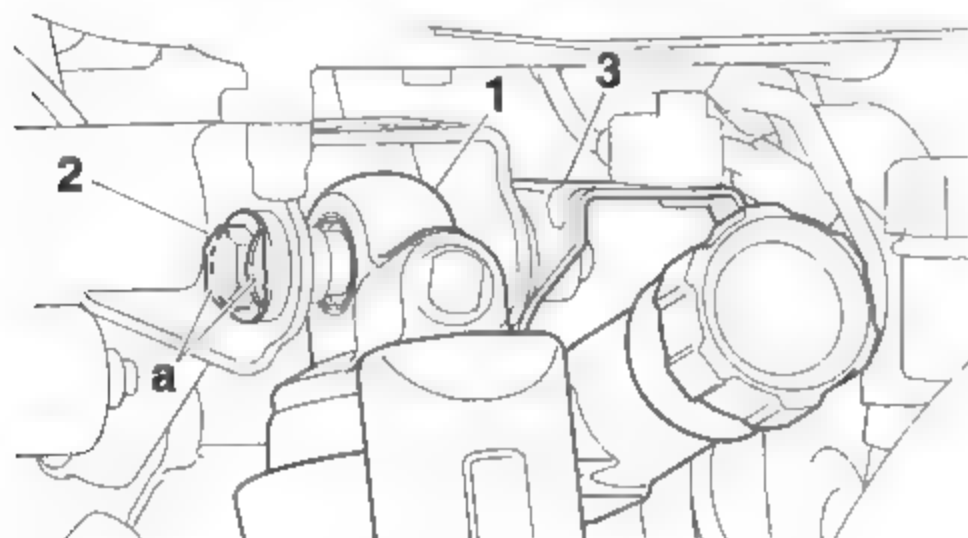
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Install:

- Rear shock absorber assembly "1"

TIP

- Install both the rear shock absorber assembly and brake hose bracket "3" using the rear shock absorber assembly bolt.
- Install the rear shock absorber assembly bolt "2" so that the bolt head fits between the projections "a" on the frame as shown in the illustration.



2. Tighten:

- Rear shock absorber assembly nut (upper side)



Rear shock absorber assembly nut (upper side)
45 N·m (4.5 kgf·m, 33 lb·ft)

EAS30222

INSTALLING THE RELAY ARM

1. Install:

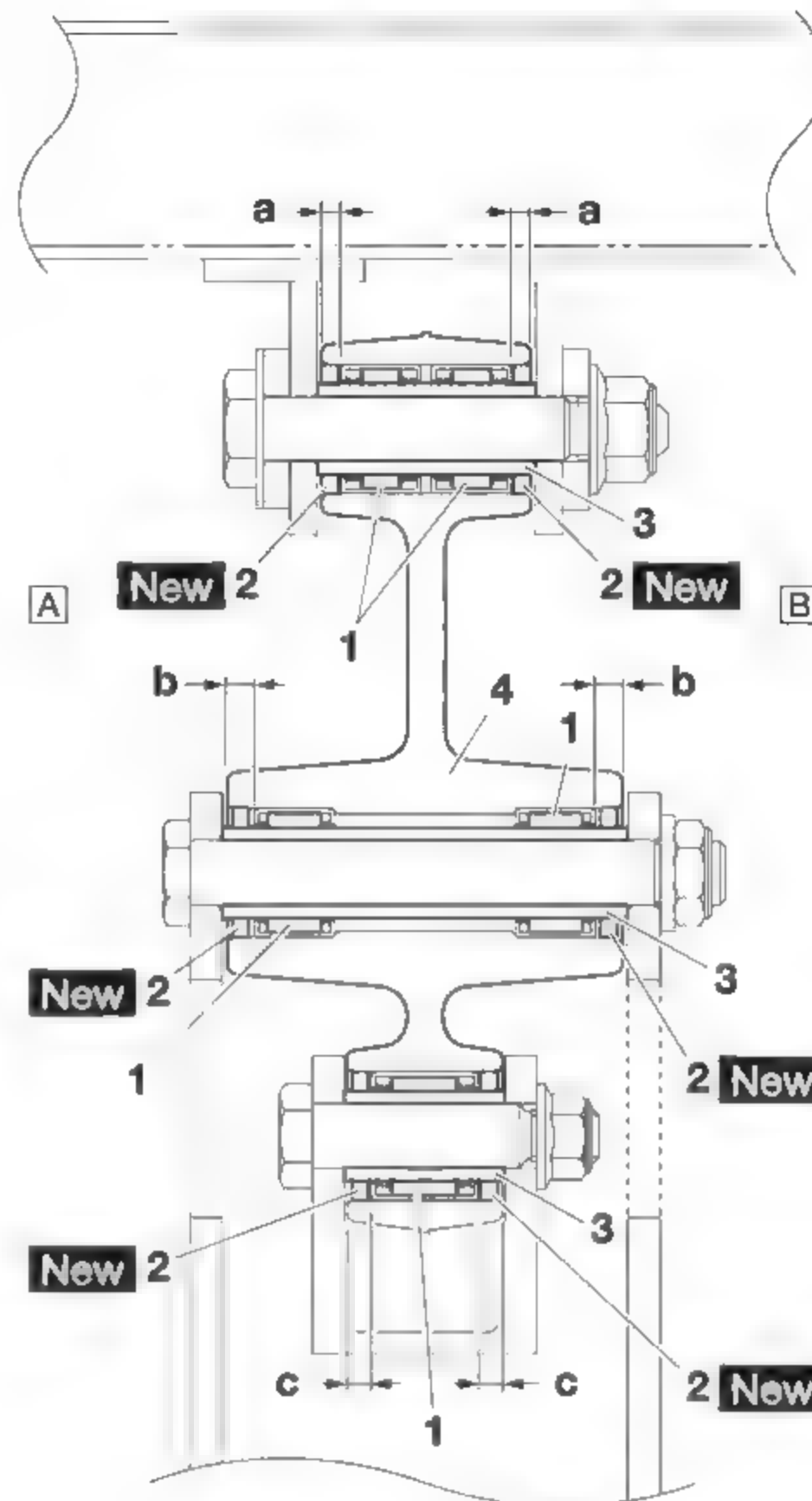
- Bearings "1"
 - Oil seals "2" **New**
 - Collars "3"
- (to the relay arm "4")



Installed depth "a" (bearing)
3.5–4.5 mm (0.14–0.17 in)
Installed depth "b" (bearing)
4.5–5.5 mm (0.17–0.21 in)
Installed depth "c" (bearing)
4.0–5.0 mm (0.15–0.19 in)

TIP

- When installing the bearings to the relay arm, apply lithium-soap-based grease on the inner surface of the relay arm.
- When installing the oil seals to the relay arm, face the character stamps of the oil seals outward.



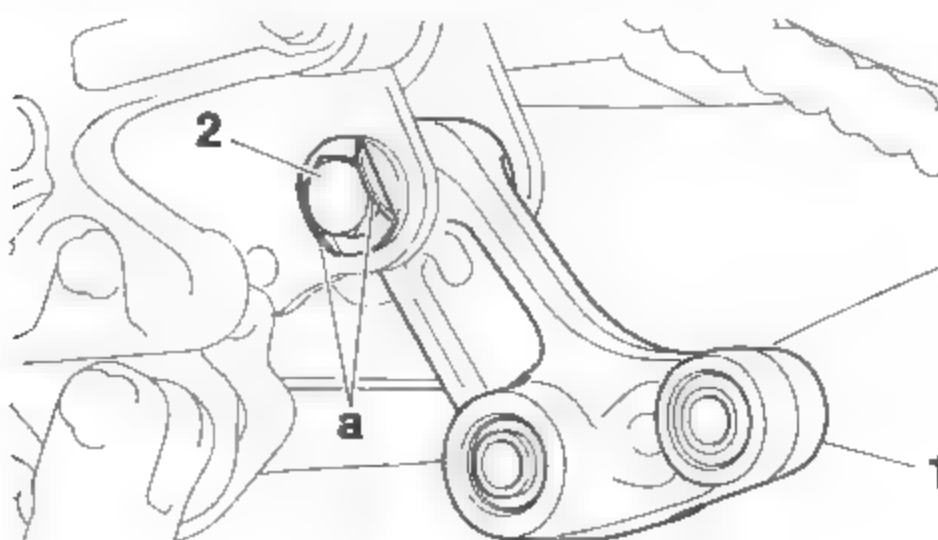
A. Left side
B. Right side

2. Install:

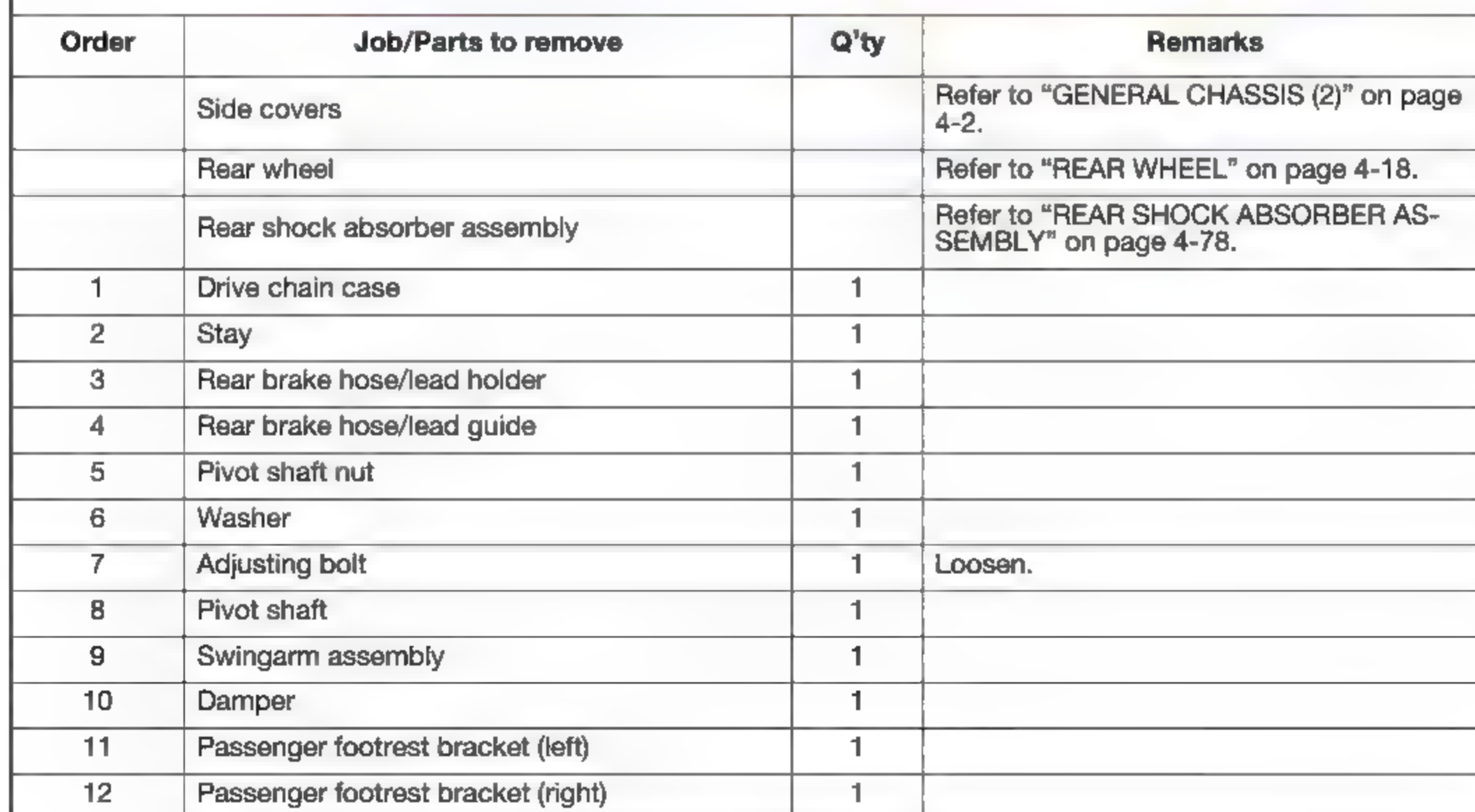
- Relay arm "1"

TIP

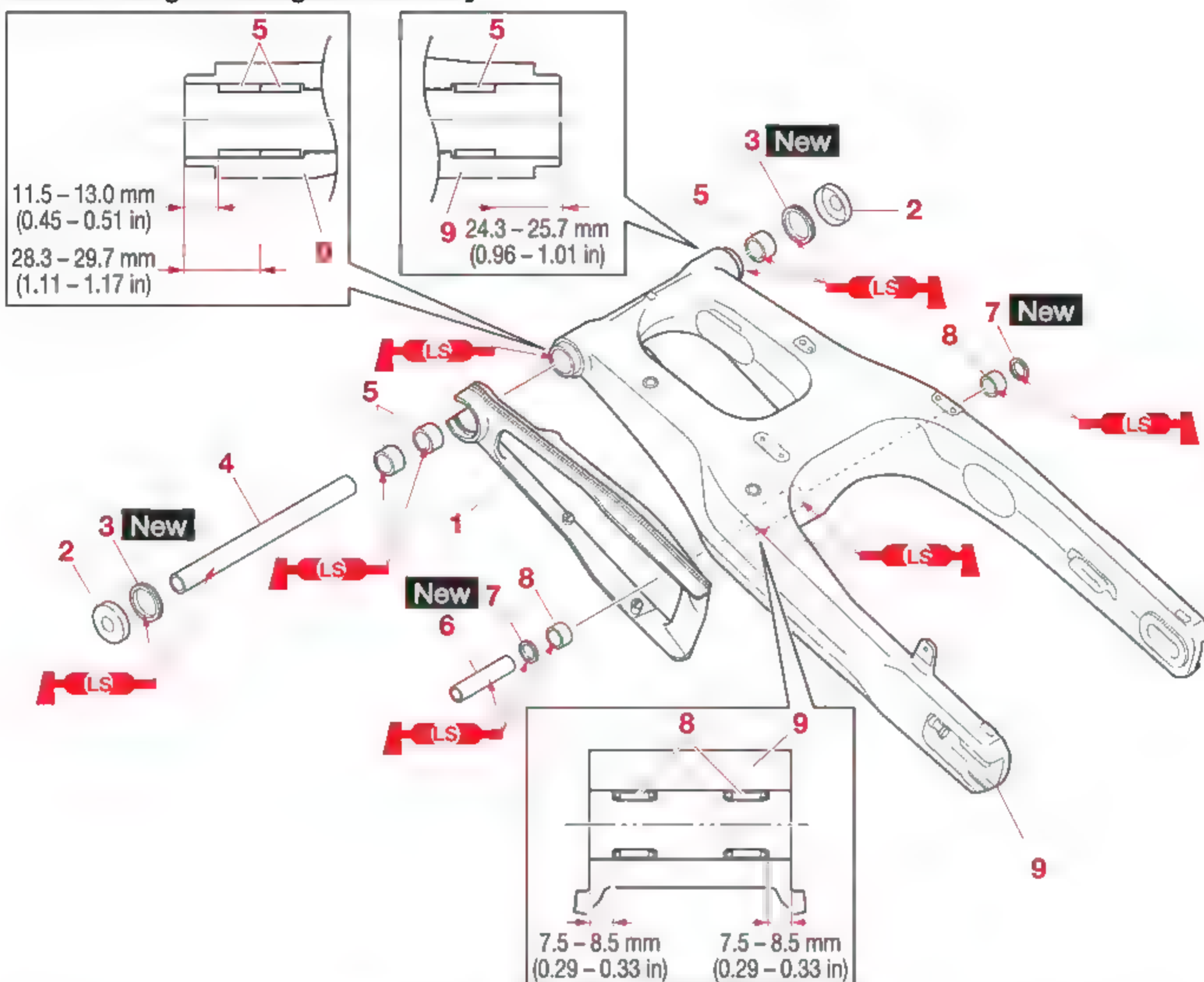
Install the relay arm bolt "2" so that the bolt head fits between the projections "a" on the frame as shown in the illustration.



Removing the swingarm



Disassembling the swingarm assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Drive chain guide	1	
2	Dust cover	2	
3	Oil seal	2	
4	Collar	1	
5	Bearing	3	
6	Collar	1	
7	Oil seal	2	
8	Bearing	2	
9	Swingarm	1	

EAS30228

REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120

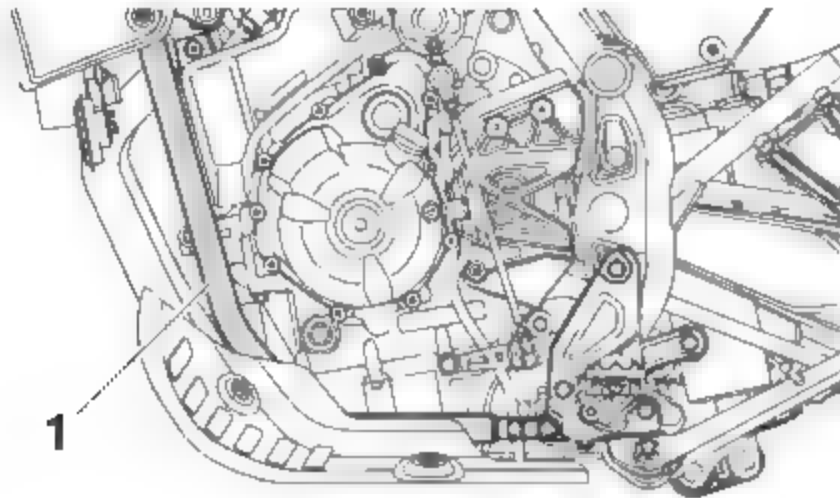
! WARNING

Securely support the vehicle so that there is no danger of it falling over.

ECA27170

NOTICE

Down tubes "1" are not designed to lift the vehicle. Do not lift the vehicle with a jack-up stand by putting it under the down tubes.



TIP

Place the vehicle on a suitable stand so that the rear wheel is elevated.

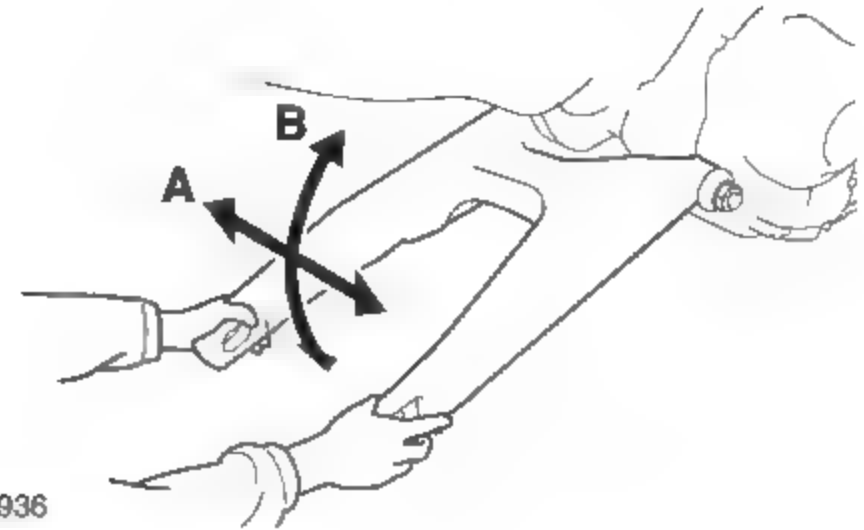
2. Measure:

- Swingarm side play
- Swingarm vertical movement
 - a. Measure the tightening torque of the pivot shaft nut.



Pivot shaft nut
110 N·m (11 kgf·m, 81 lb·ft)

- b. Check the swingarm side play "A" by moving the swingarm from side to side. If the swingarm has side-to-side play, check the collars, bearings, dust covers, and adjusting bolt.
- c. Check the swingarm vertical movement "B" by moving the swingarm up and down. If the swingarm vertical movement is not smooth or if there is binding, check the pivot shaft, collars, bearings, dust covers, and adjusting bolt.



G088936

3. Remove:

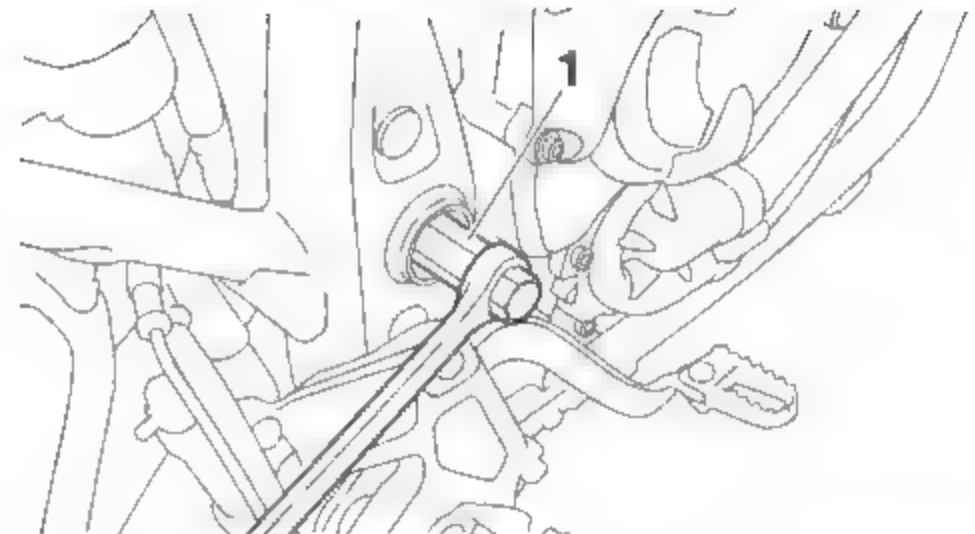
- Pivot shaft nut
- Washer

4. Check:

- Installed condition of the adjusting bolt
 - a. While slowly pulling out the pivot shaft, insert engine alignment tool "1" and set the engine alignment tool on the adjusting bolt.



Engine alignment tool
90890-11097
Engine alignment tool
YM-11097



- b. Turn the engine alignment tool clockwise and make sure that the adjusting bolt does not turn. If the adjusting bolt turns clockwise, check the pivot shaft, collars, bearings, dust covers, and adjusting bolt.

5. Loosen:

- Adjusting bolt



Engine alignment tool
90890-11097
Engine alignment tool
YM-11097

6. Remove:

- Pivot shaft
- Swingarm

EAS30227

CHECKING THE SWINGARM

1. Check:
 - Swingarm
 - Bends/cracks/damage → Replace.
2. Check:
 - Pivot shaft
 - Roll the pivot shaft on a flat surface.
 - Bends → Replace.

EWA13770



Do not attempt to straighten a bent pivot shaft.

3. Wash:
 - Pivot shaft
 - Dust covers
 - Collars
 - Bearings
 - Washer
 - Adjusting bolt



Recommended cleaning solvent
Kerosene

4. Check:
 - Dust covers
 - Adjusting bolt
 - Damage/wear → Replace.
 - Bearings
 - Damage/pitting → Replace.
 - Collars
 - Damage/scratches → Replace.

EAS30228

INSTALLING THE SWINGARM

1. Lubricate:
 - Bearings
 - Oil seals
 - Pivot shaft
 - Collar
2. Install:
 - Bearings "1"
 - Oil seals "2" **New**
(to the swingarm "3")



Recommended lubricant
Lithium-soap-based grease



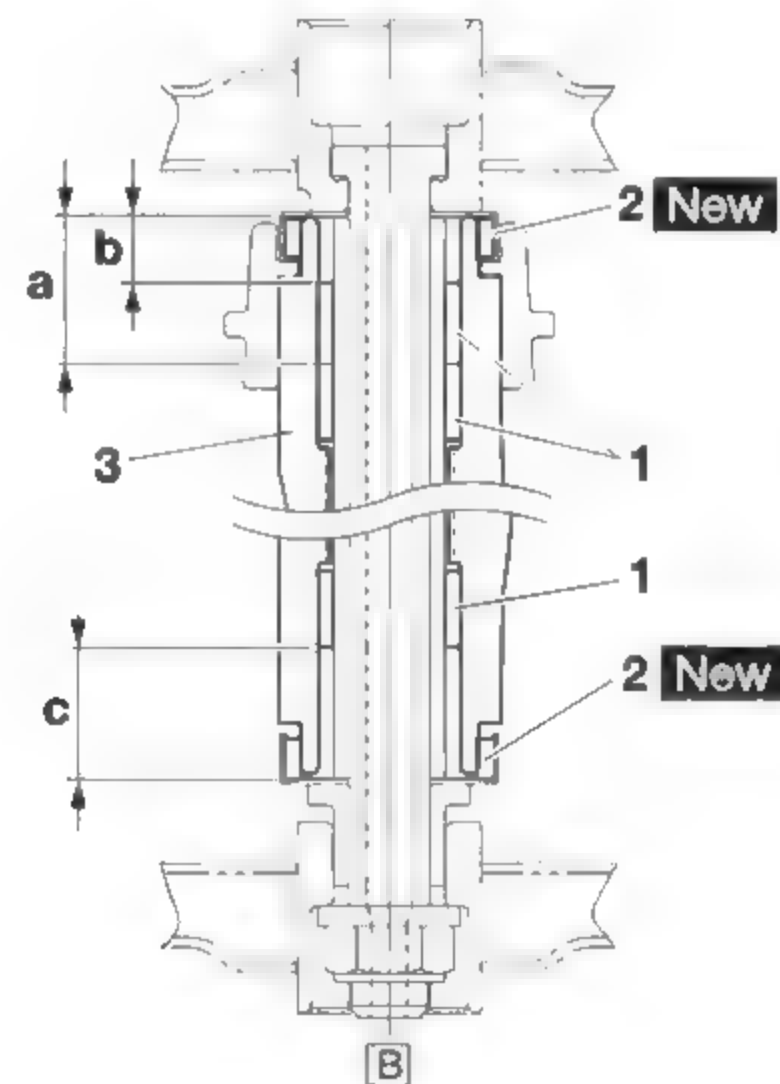
Installed depth "a"
28.3–29.7 mm (1.11–1.17 in)
Installed depth "b"
11.5–13.0 mm (0.45–0.51 in)
Installed depth "c"
24.3–25.7 mm (0.96–1.01 in)
Installed depth "d"
7.5–8.5 mm (0.29–0.33 in)

TIP

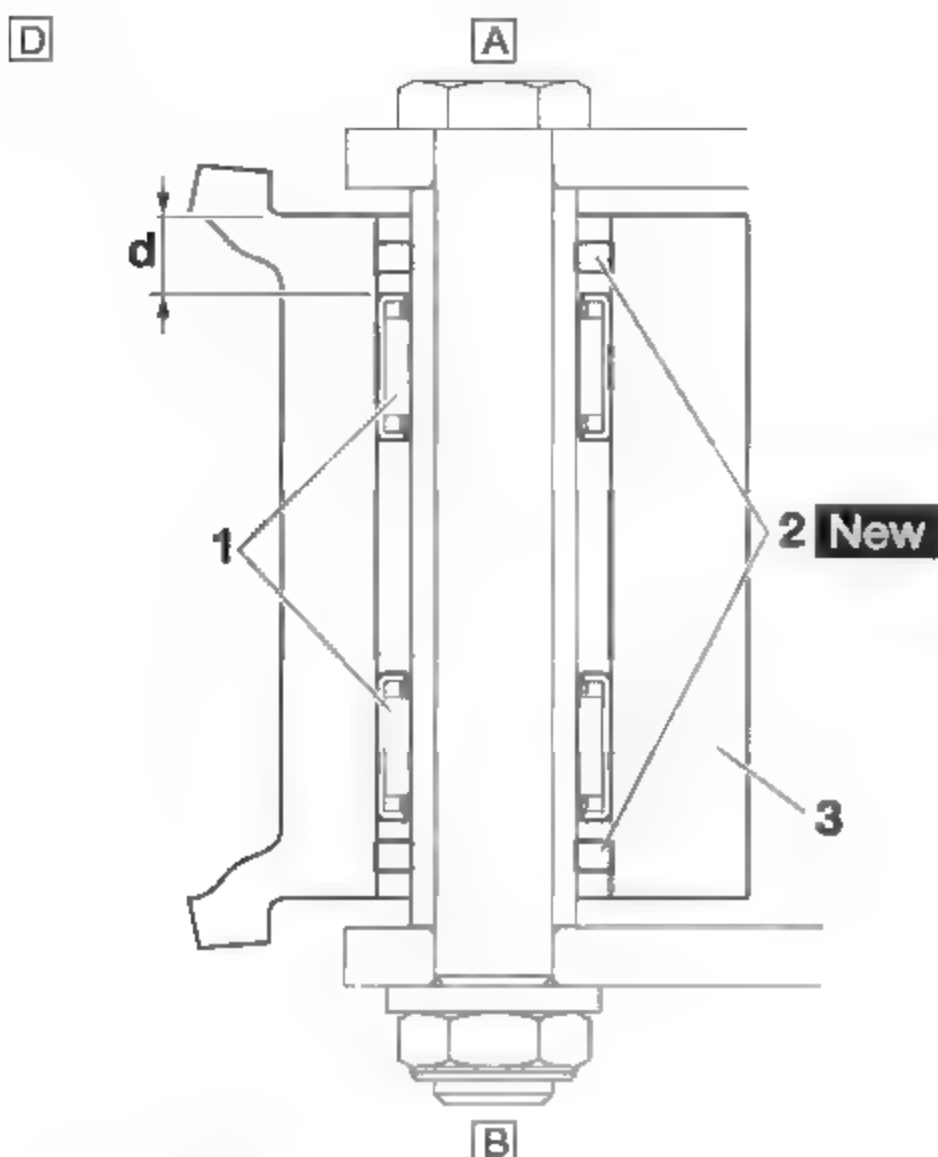
- When installing the bearings to the swingarm, apply lithium-soap-based grease on the inner surface of the swingarm.
- Install the bearings to the swingarm so that the marks are facing outward.

[C]

[A]



[B]



- A. Left side
- B. Right side
- C. Pivot shaft side
- D. Connecting arm side

3. Install:
- Adjusting bolt (to the frame)

TIP

Temporarily tighten the adjusting bolt until its flange contacts the frame.

4. Install:
- Swingarm
 - Pivot shaft
5. Tighten:
- Adjusting bolt

TIP

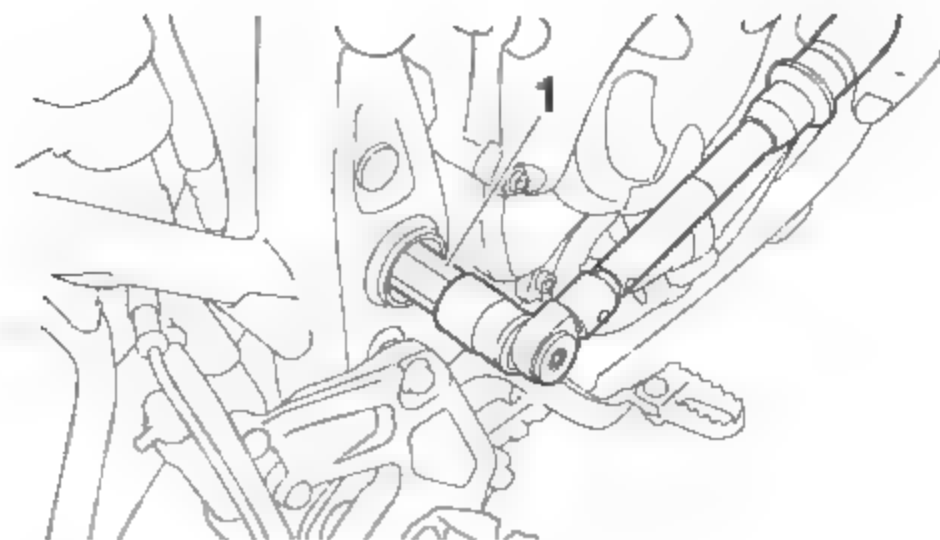
- While slowly pulling out the pivot shaft, insert engine alignment tool "1" and set the engine alignment tool on the adjusting bolt.
- Make sure that the flange on the adjusting bolt contacts the dust cover on the swingarm.



Engine alignment tool
90890-11097
Engine alignment tool
YM-11097



Adjusting bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)



6. Install:
- Washer
 - Pivot shaft nut



Pivot shaft nut
110 N·m (11 kgf·m, 81 lb·ft)

7. Install:
- Rear wheel
- Refer to "REAR WHEEL" on page 4-18.
8. Adjust:
- Drive chain slack
- Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-19.

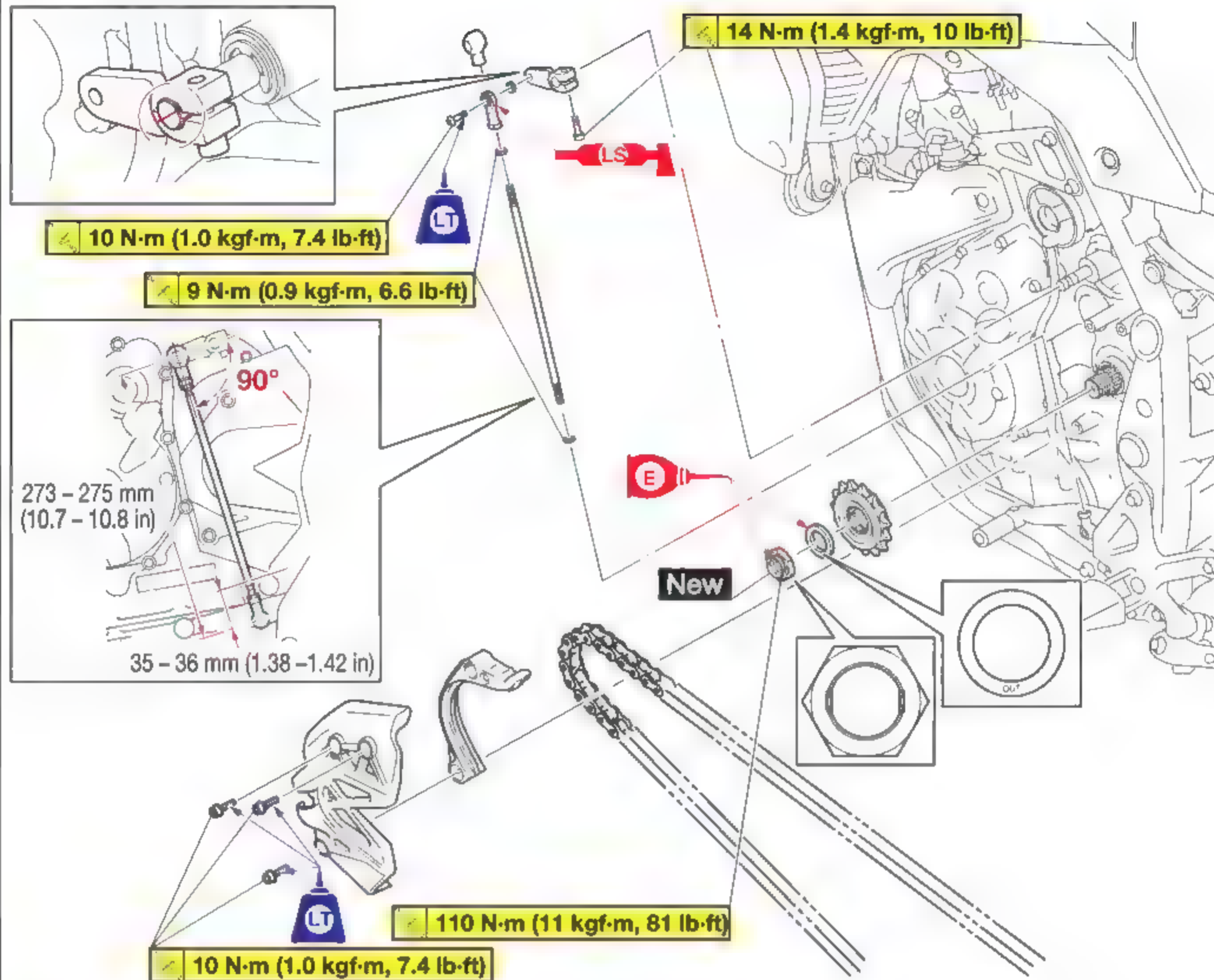


Drive chain slack (Sidestand)
43.0–48.0 mm (1.69–1.89 in)
Drive chain slack (Maintenance stand)
43.0–48.0 mm (1.69–1.89 in)
Drive chain slack limit
55.0 mm (2.17 in)

EA S2003-8

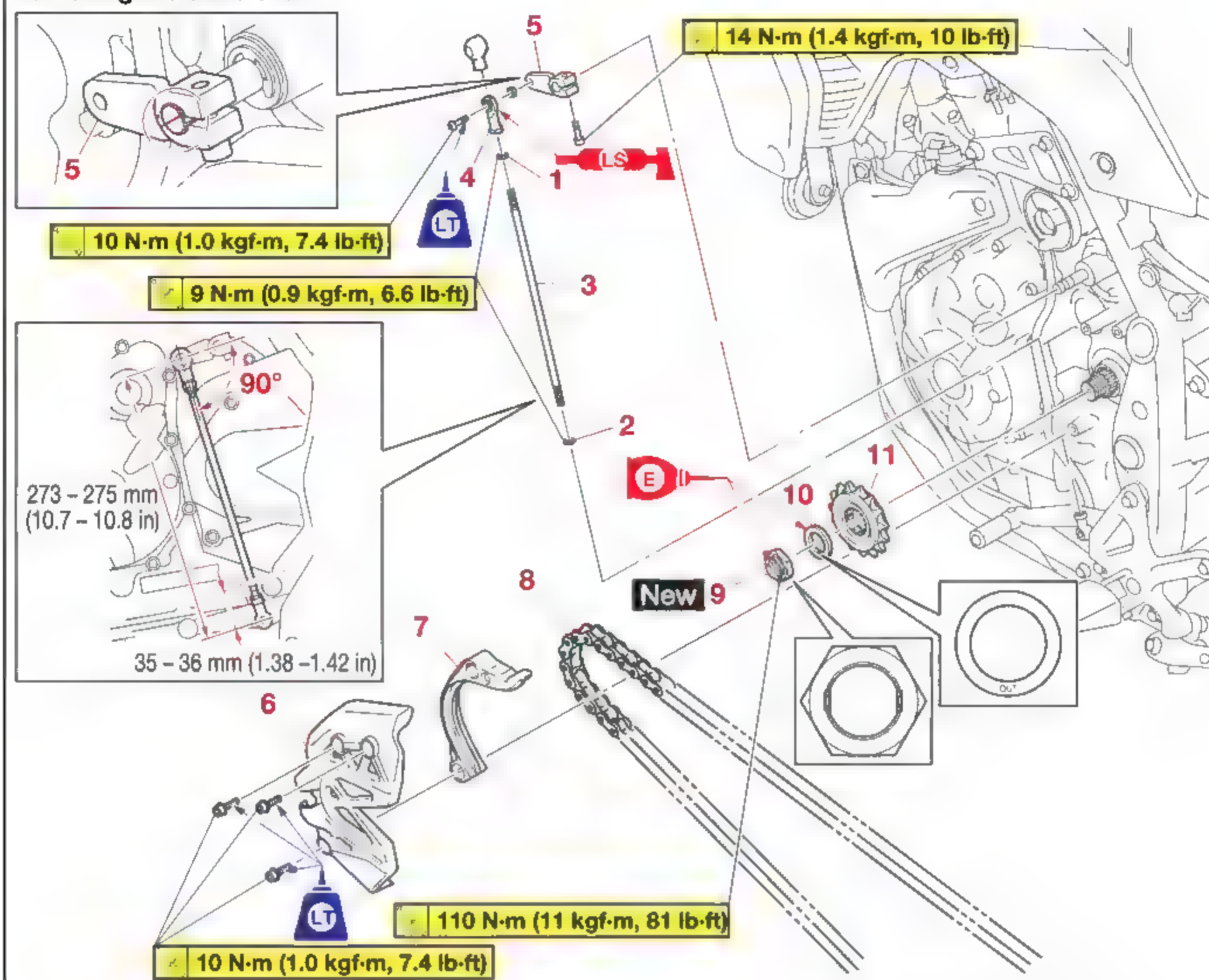
CHAIN DRIVE

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
	Side covers		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Rear wheel		TIP Loosen the drive sprocket nut before removing the rear wheel. Refer to "REAR WHEEL" on page 4-18.
	Rear shock absorber assembly		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-78.
	Swingarm		Refer to "SWINGARM" on page 4-82.

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
1	Shift rod locknut (shift arm side)	1	Loosen.
2	Shift rod locknut (shift pedal side)	1	Loosen. Left-hand threads
3	Shift rod	1	
4	Shift rod joint	1	
5	Shift arm	1	
6	Drive sprocket cover	1	
7	Drive chain guide	1	
8	Drive chain	1	
9	Drive sprocket nut	1	
10	Washer	1	
11	Drive sprocket	1	

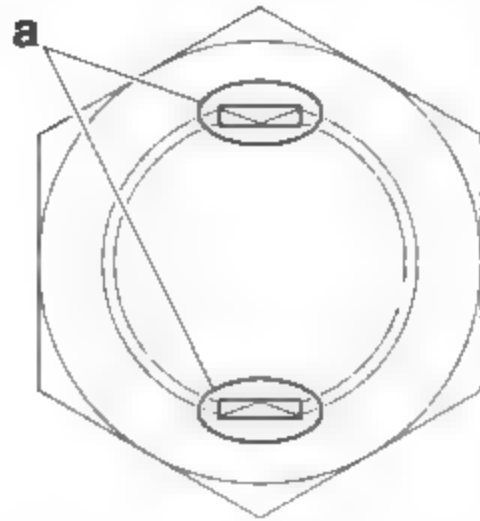
EAS31115

REMOVING THE DRIVE SPROCKET

TIP

Loosen the drive sprocket nut before removing the rear wheel.

1. Straighten the drive sprocket nut ribs "a".



2. Loosen:

- Drive sprocket nut

TIP

Loosen the drive sprocket nut while pressing the brake pedal.

EAS30230

CHECKING THE DRIVE CHAIN

1. Measure:

- 15-link section "a" of the drive chain
Out of specification → Replace the drive chain.

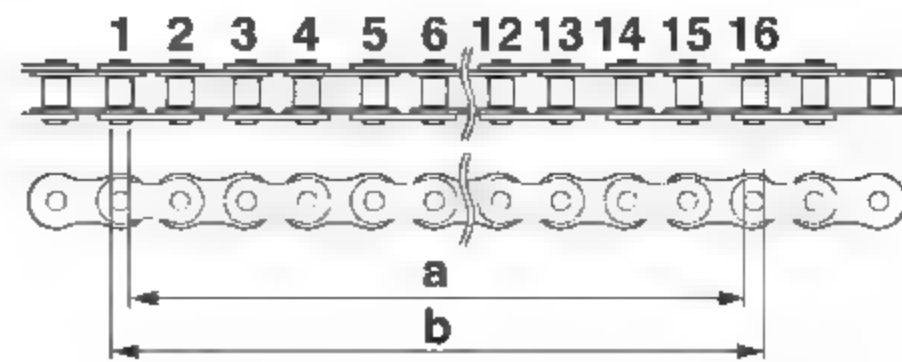


15-link length limit
239.3 mm (9.42 in)

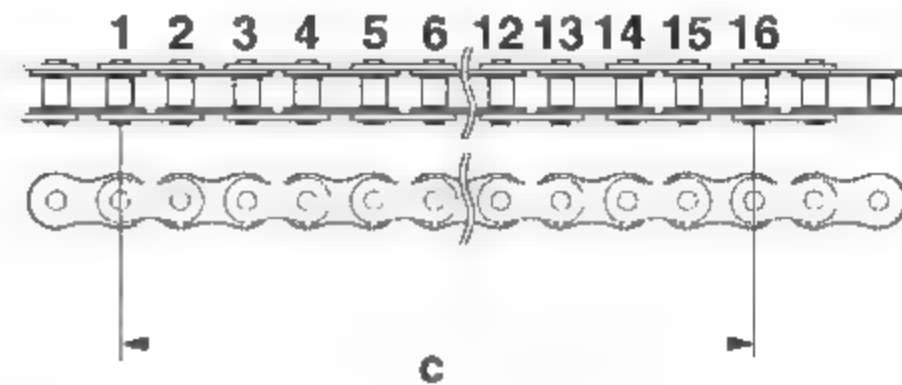
- a. Measure the length "b" between the inner sides of the pins and the length "c" between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.
- b. Calculate the length "a" of the 15-link section of the drive chain using the following formula.
Drive chain 15-link section length "a" = (length "b" between pin inner sides + length "c" between pin outer sides)/2

TIP

- When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.
- Perform this procedure 2–3 times, at a different location each time.



G088937



G088938

2. Check:

- Drive chain
Stiffness → Clean and lubricate or replace.



G088939

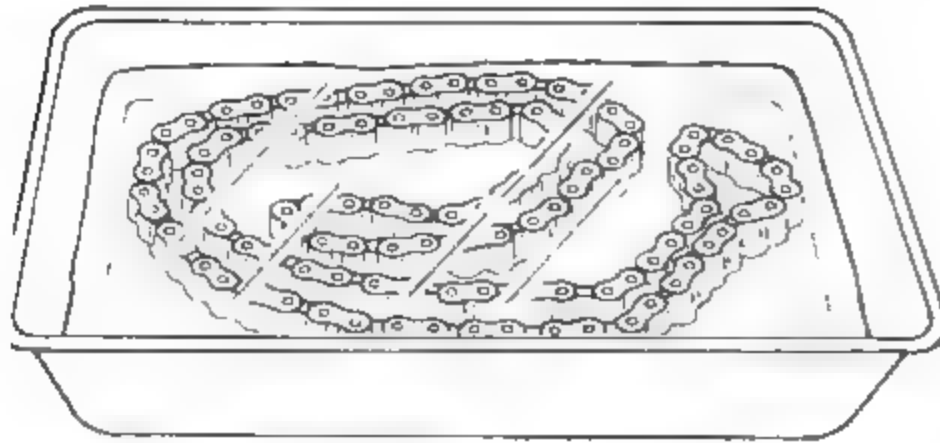
3. Clean:

- Drive chain
 - a. Wipe the drive chain with a clean cloth.
 - b. Put the drive chain in kerosene and remove any remaining dirt.
 - c. Remove the drive chain from the kerosene and completely dry it.

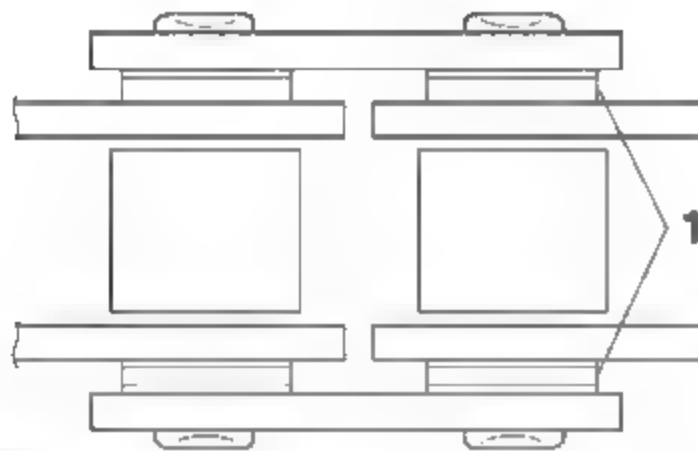
NOTICE

- This motorcycle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.

- Do not soak the drive chain in kerosene for more than ten minutes, otherwise the O-rings can be damaged.

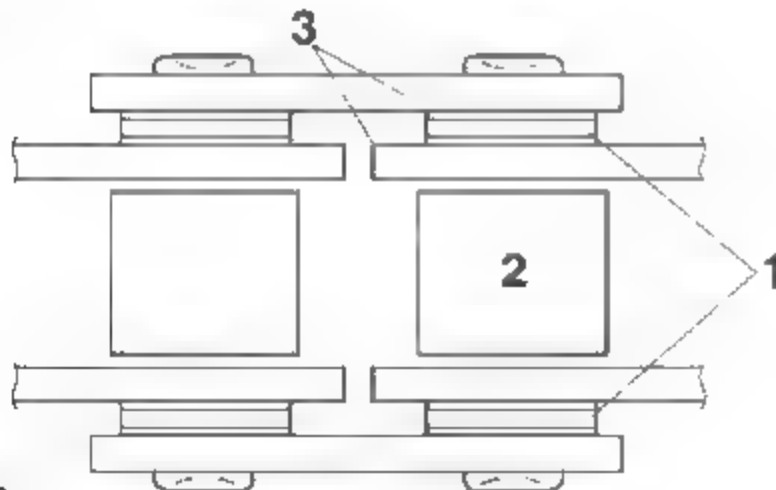


G088940



G088941

4. Check:
 - O-rings "1"
 - Damage → Replace the drive chain.
 - Drive chain rollers "2"
 - Damage/wear → Replace the drive chain.
 - Drive chain side plates "3"
 - Damage/wear/cracks → Replace the drive chain.



G088943

5. Lubricate:
 - Drive chain

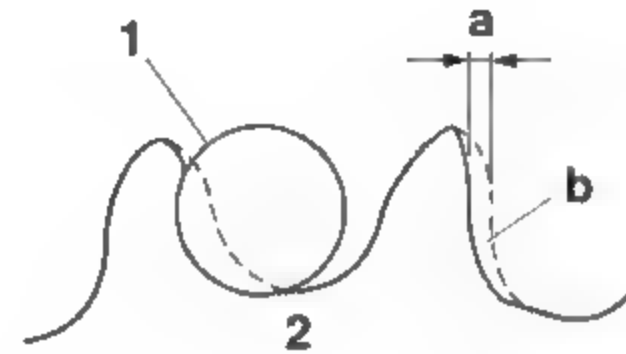


Recommended lubricant
Chain lubricant suitable for O-ring chains

EAS30231

CHECKING THE DRIVE SPROCKET

1. Check:
 - Drive sprocket
 - More than 1/4 tooth "a" wear → Replace the drive sprocket, drive chain, and rear wheel sprocket as a set.
 - Bent teeth → Replace the drive sprocket, drive chain, and rear wheel sprocket as a set.



EAS30231

- b. Correct
- 1. Drive chain roller
- 2. Drive sprocket

EAS30232

CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-22.

EAS30233

CHECKING THE REAR WHEEL DRIVE HUB

Refer to "CHECKING THE REAR WHEEL DRIVE HUB" on page 4-21.

EAS31116

INSTALLING THE DRIVE SPROCKET

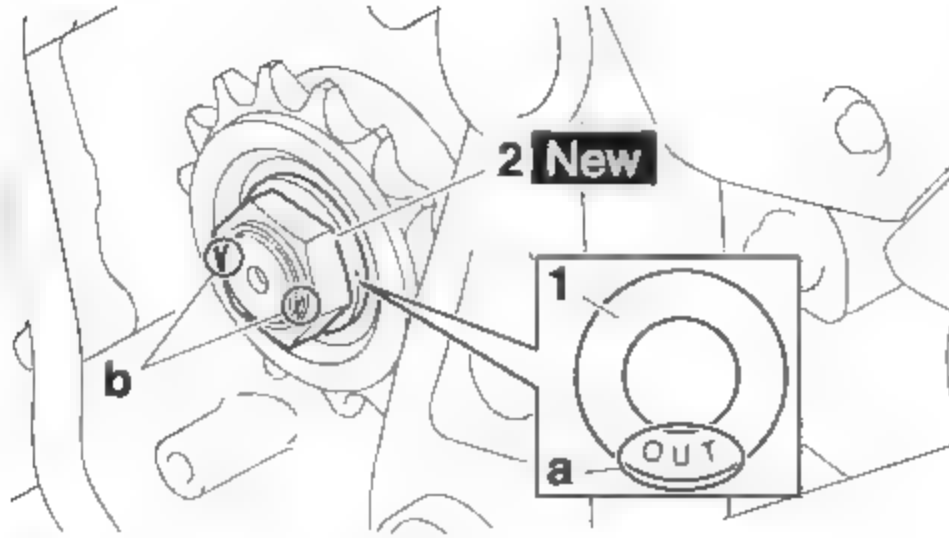
1. Install:
 - Drive sprocket
 - Washer "1"
 - Drive sprocket nut "2" **New**



Drive sprocket nut
110 N·m (11 kgf·m, 81 lb·ft)

TIP

- While applying the rear brake, tighten the drive sprocket nut.
- Install washer with the "OUT" mark "a" facing out.
- Stake the drive sprocket nut at cutouts "b" in the drive axle.



EAS30234

INSTALLING THE DRIVE CHAIN

1. Install:

- Drive chain

TIP

Install the drive chain joint with the drive chain cut & rivet tool.



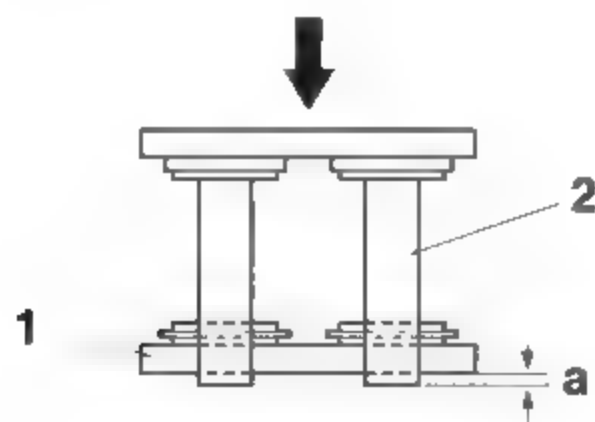
Drive chain cut & rivet tool
90890-01550

Drive chain cut & rivet tool
YM-01550

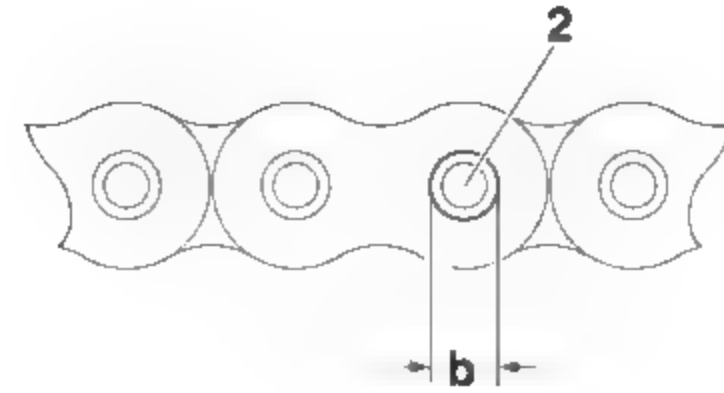
- a. When press fitting the connecting plate "1", make sure the space "a" between the end of the connecting pin "2" and the connecting plate is 1.2–1.4 mm (0.05–0.06 in).

TIP

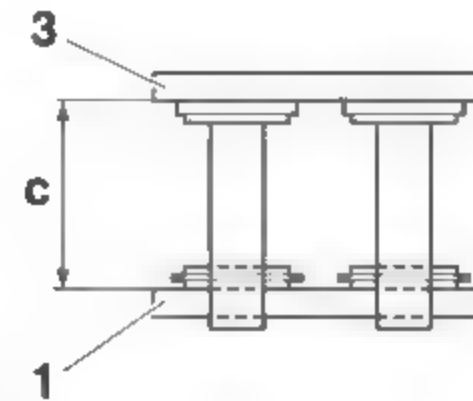
Apply lithium soap-based grease onto the connecting pin "2".



- b. After riveting, make sure the diameter between the edges "b" of the connecting pin "2" is 5.7–6.0 mm (0.22–0.24 in).



- c. After riveting, make sure the space "c", which is inside of the connecting link "3" and inside of the connecting plate "1", is 14.6–14.8 mm (0.57–0.58 in).



2. Lubricate:

- Drive chain



Recommended lubricant
Chain lubricant suitable for O-ring chains

3. Install:

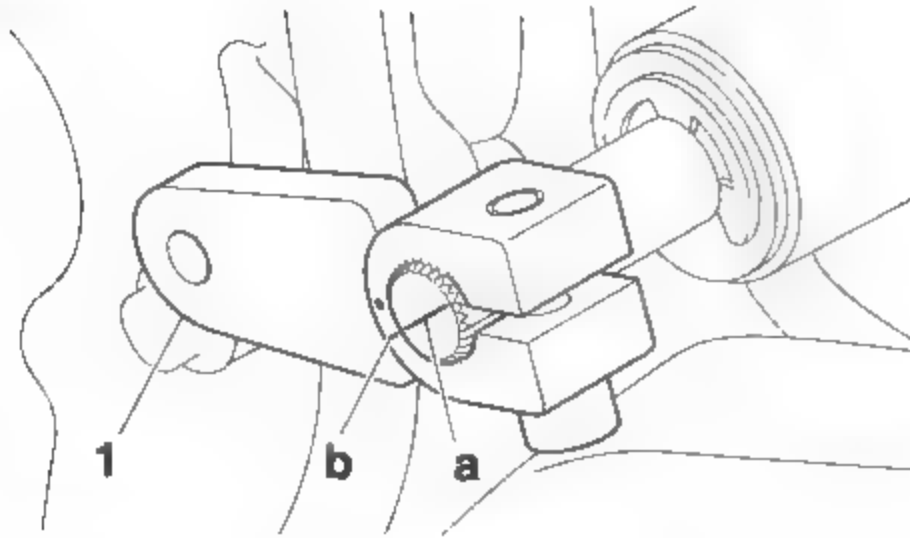
- Shift arm "1"
- Shift rod joint
- Shift rod
- Shift rod locknuts

TIP

Before installing, make sure to align the mark "a" of the shift shaft with the mark "b" of the shift arm.



Shift arm pinch bolt
14 N·m (1.4 kgf·m, 10 lb·ft)

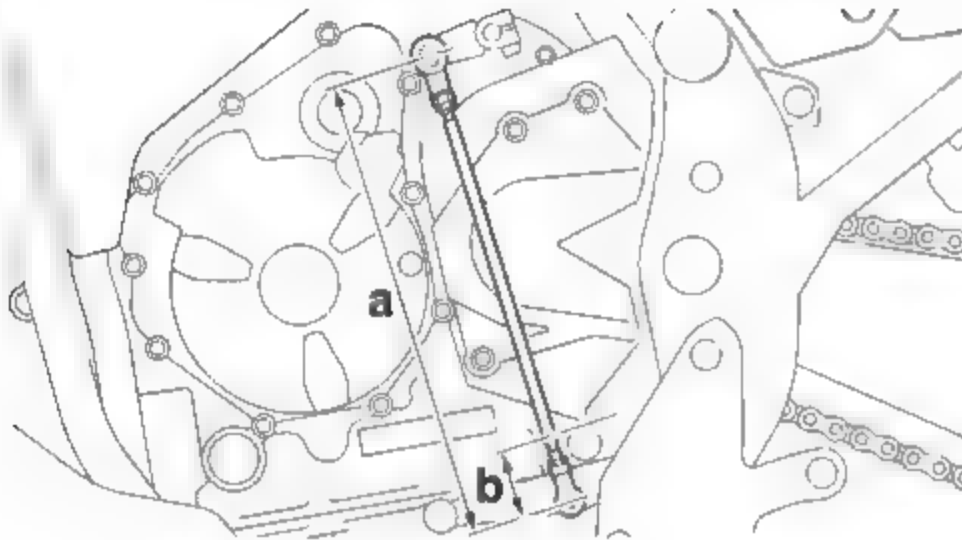


4. Measure:

- Installed shift rod length "a" and "b"
- Incorrect → Adjust.



Installed length "a"
273–275 mm (10.7–10.8 in)
Installed length "b"
35–36 mm (1.38–1.42 in)



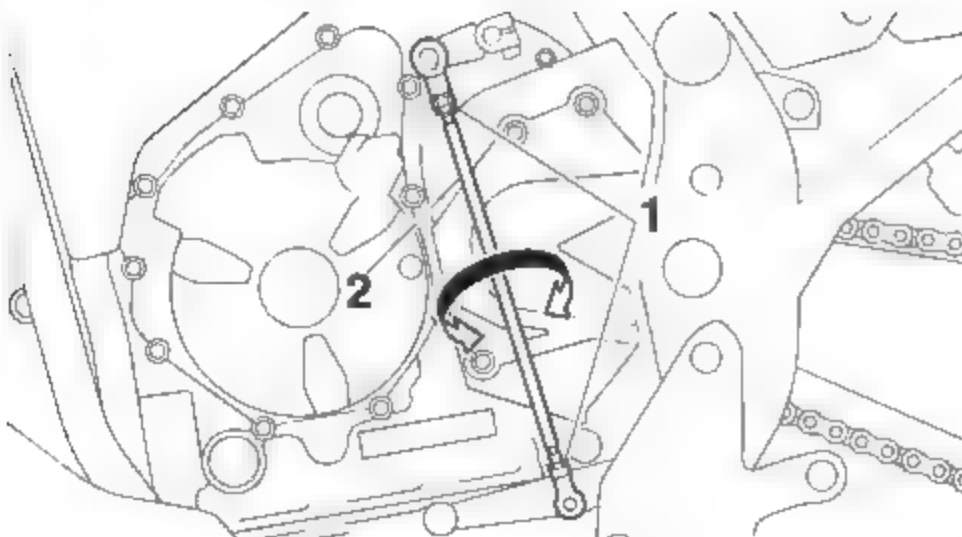
5. Adjust:

- Installed shift rod length
- a. Loosen both locknuts "1".

TIP

The shift rod locknut (shift pedal side) has left-hand threads.

- b. Turn the shift rod "2" to obtain the correct shift pedal position.

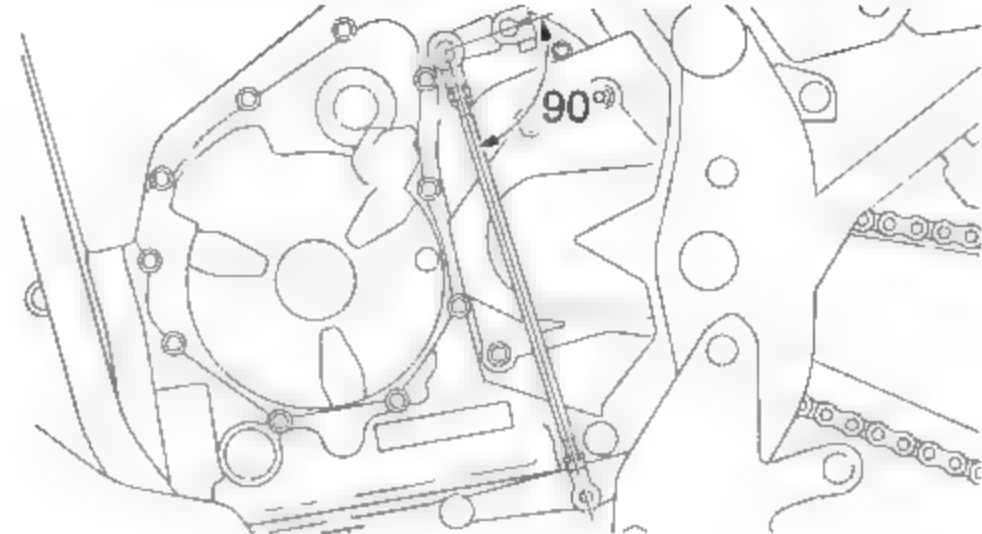


- c. Tighten both locknuts.



Shift rod locknut (shift arm side)
9 N·m (0.9 kgf·m, 6.6 lb·ft)
Shift rod locknut (shift pedal side)
9 N·m (0.9 kgf·m, 6.6 lb·ft)
Left-hand threads

- d. Make sure that the angle between the shift arm and the shift rod is about 90°.



6. Adjust:

- Drive chain slack
- Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-19.



Drive chain slack (Sidestand)
43.0–48.0 mm (1.69–1.89 in)
Drive chain slack (Maintenance stand)
43.0–48.0 mm (1.69–1.89 in)
Drive chain slack limit
55.0 mm (2.17 in)

ECA13550

NOTICE

A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swing-arm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

ENGINE

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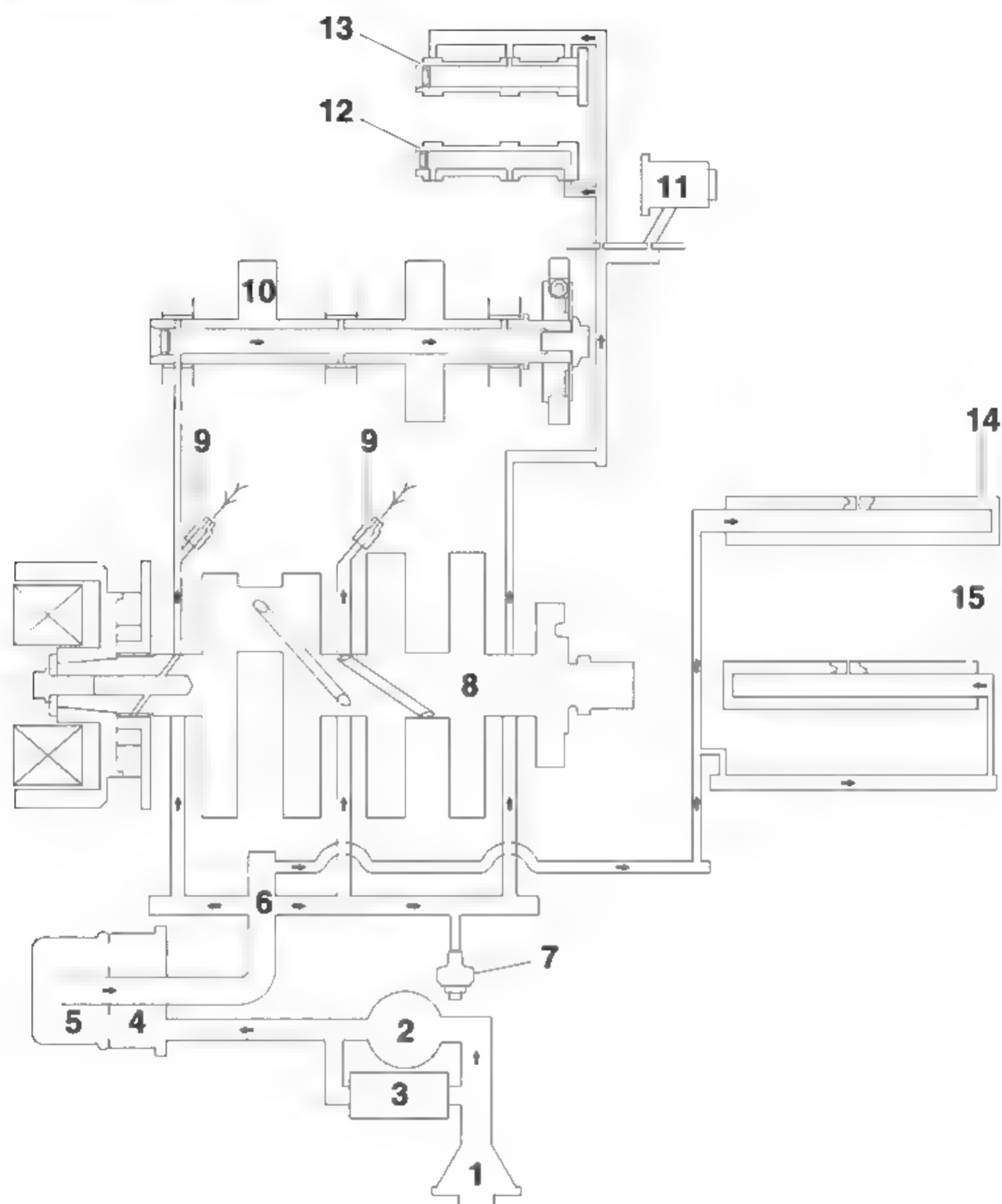
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20288

LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS2382

ENGINE OIL LUBRICATION CHART



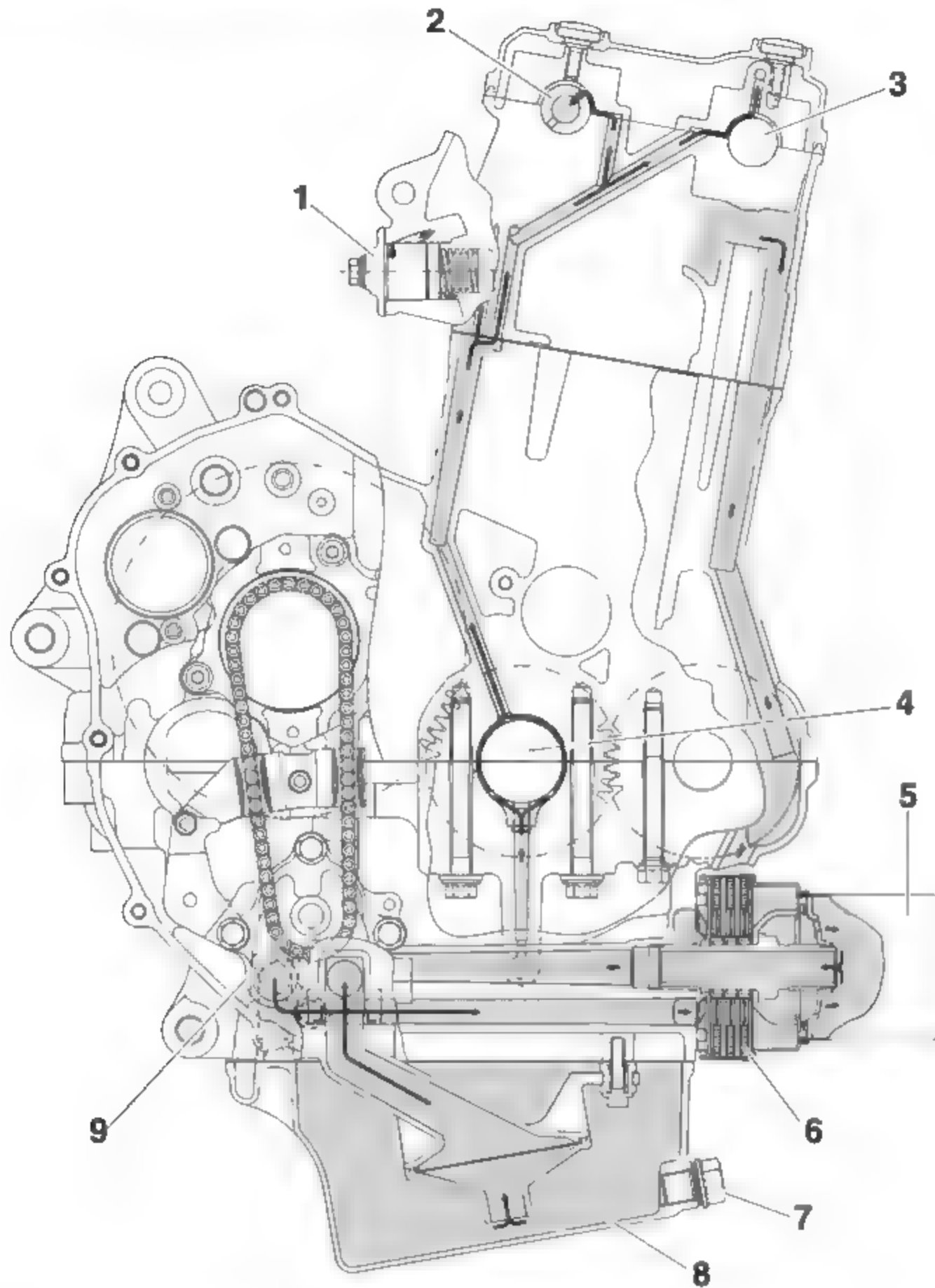
1. Oil strainer
2. Oil pump
3. Relief valve
4. Oil cooler
5. Oil filter cartridge
6. Main gallery
7. Oil pressure switch
8. Crankshaft
9. Oil nozzle
10. Balancer shaft assembly
11. Timing chain tensioner
12. Intake camshaft
13. Exhaust camshaft
14. Main axle
15. Drive axle

LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS32363

LUBRICATION DIAGRAMS

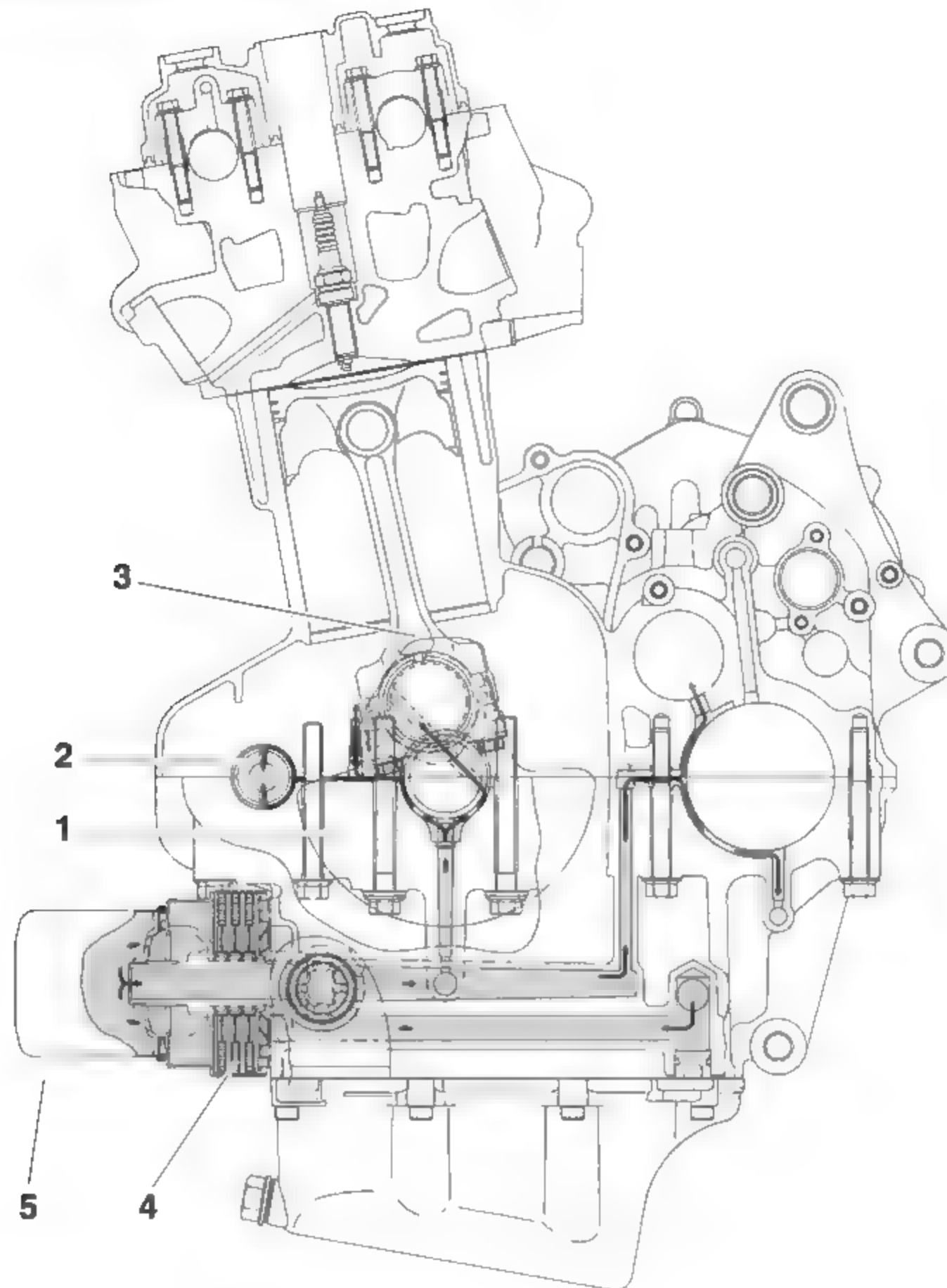
Crankcase, cylinder, and cylinder head (right side view)



1. Timing chain tensioner
2. Intake camshaft
3. Exhaust camshaft
4. Crankshaft
5. Oil filter cartridge
6. Oil cooler
7. Oil drain bolt
8. Oil strainer
9. Oil pump

LUBRICATION SYSTEM CHART AND DIAGRAMS

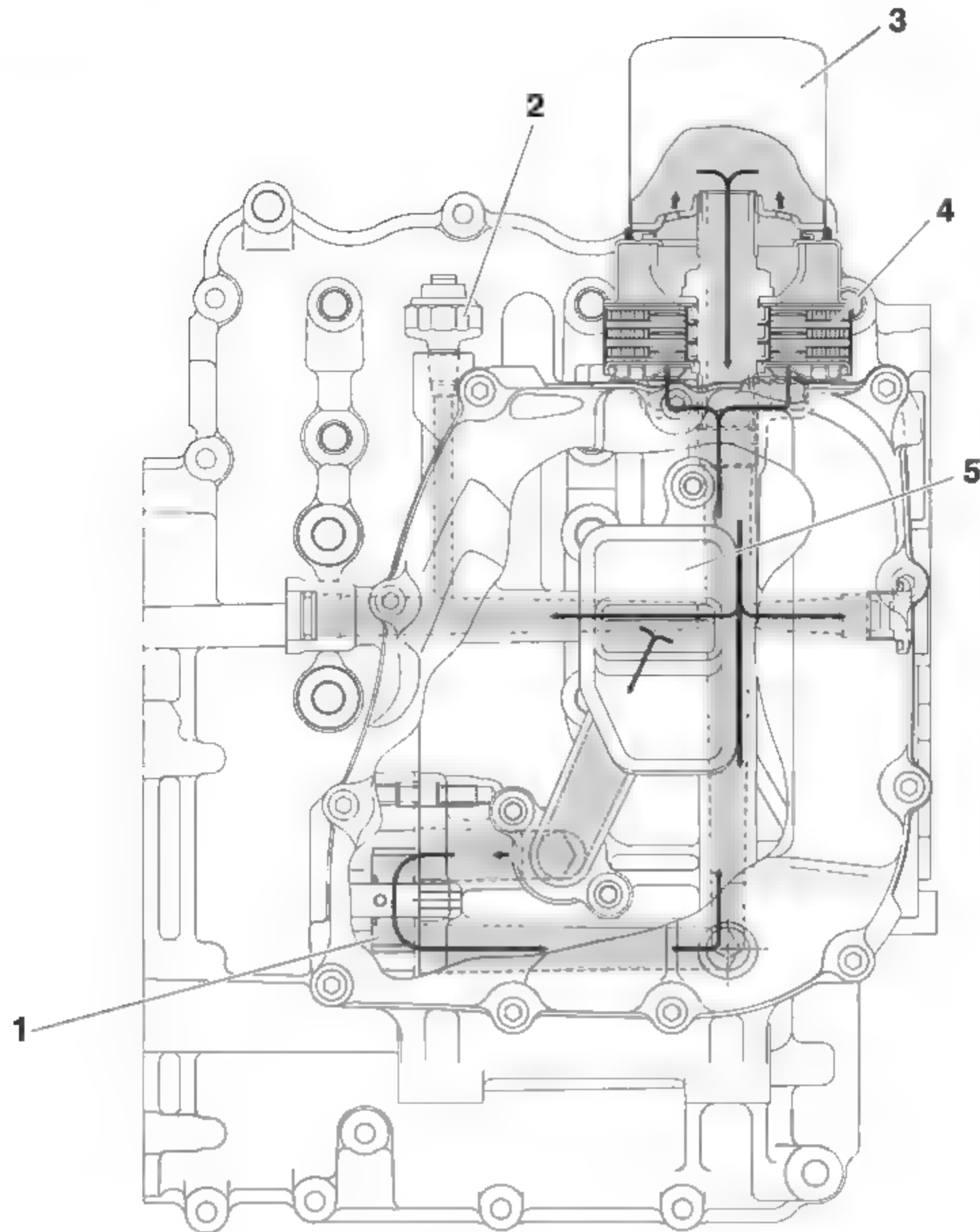
Crankcase and cylinder (left side view)



- 1. Crankshaft
- 2. Balancer shaft assembly
- 3. Connecting rod
- 4. Oil cooler
- 5. Oil filter cartridge

LUBRICATION SYSTEM CHART AND DIAGRAMS

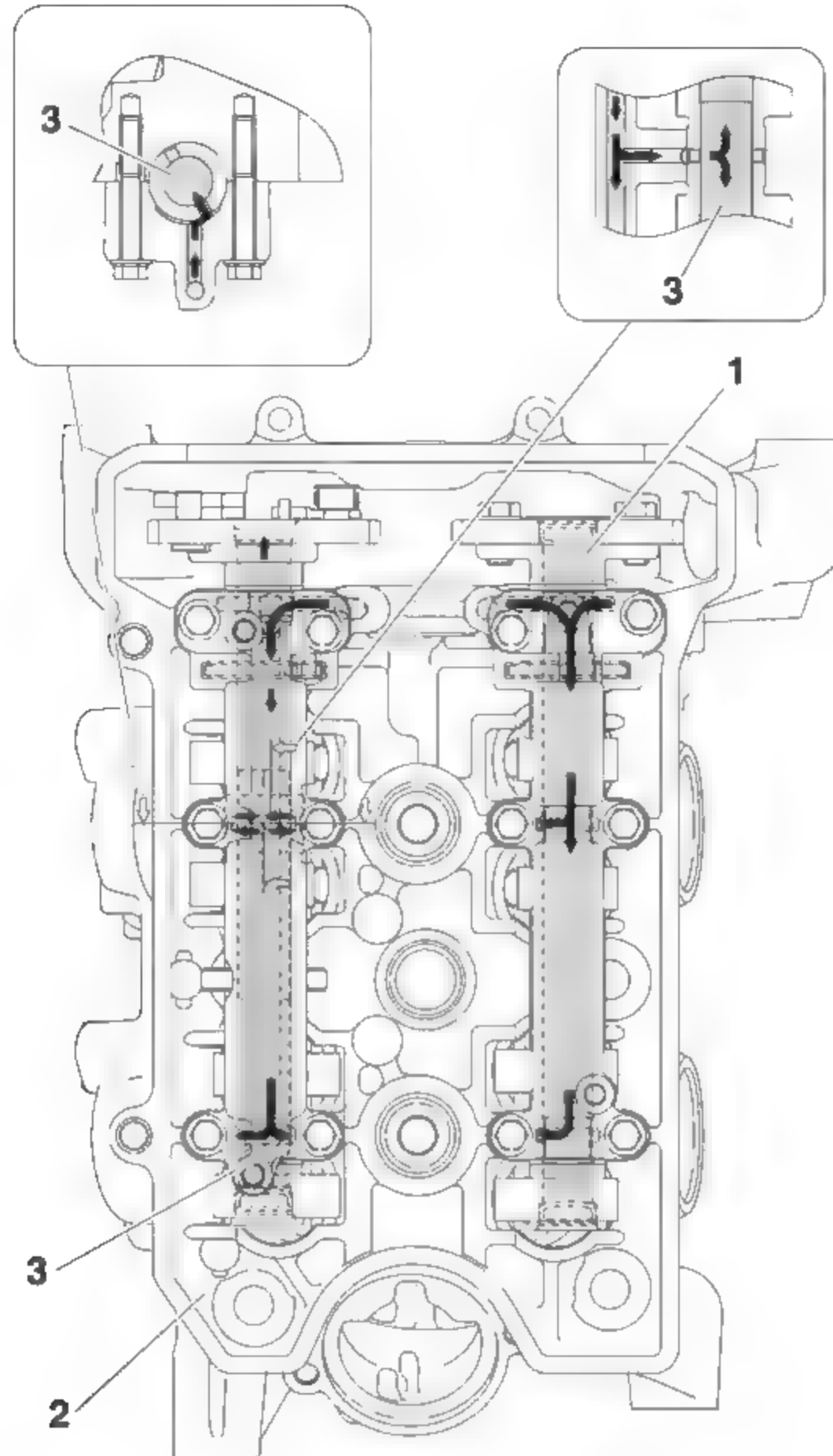
Oil pump (bottom view)



1. Oil pump
2. Oil pressure switch
3. Oil filter cartridge
4. Oil cooler
5. Oil strainer

LUBRICATION SYSTEM CHART AND DIAGRAMS

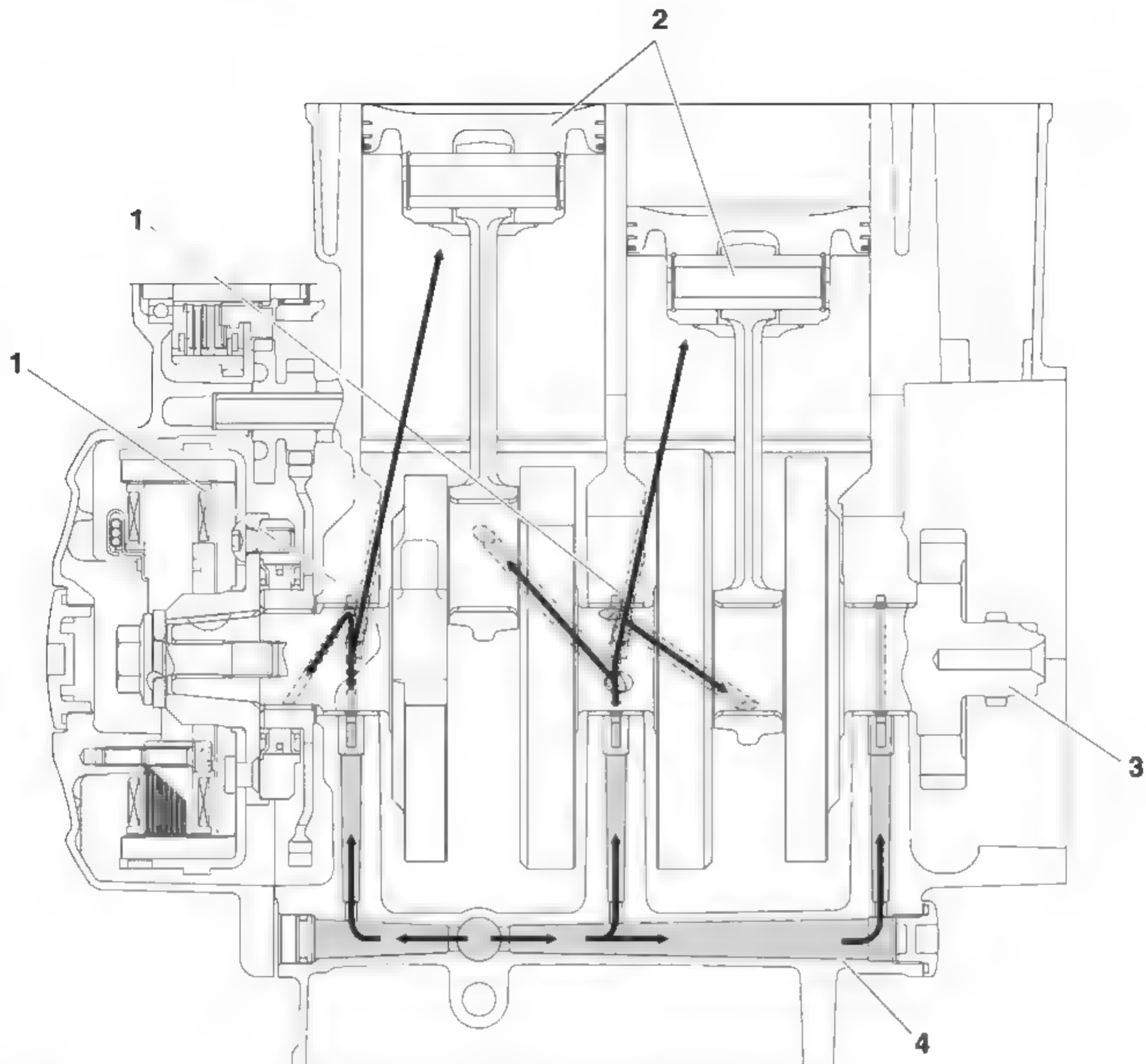
Camshaft (top view)



- 1. Intake camshaft
- 2. Cylinder head
- 3. Exhaust camshaft

LUBRICATION SYSTEM CHART AND DIAGRAMS

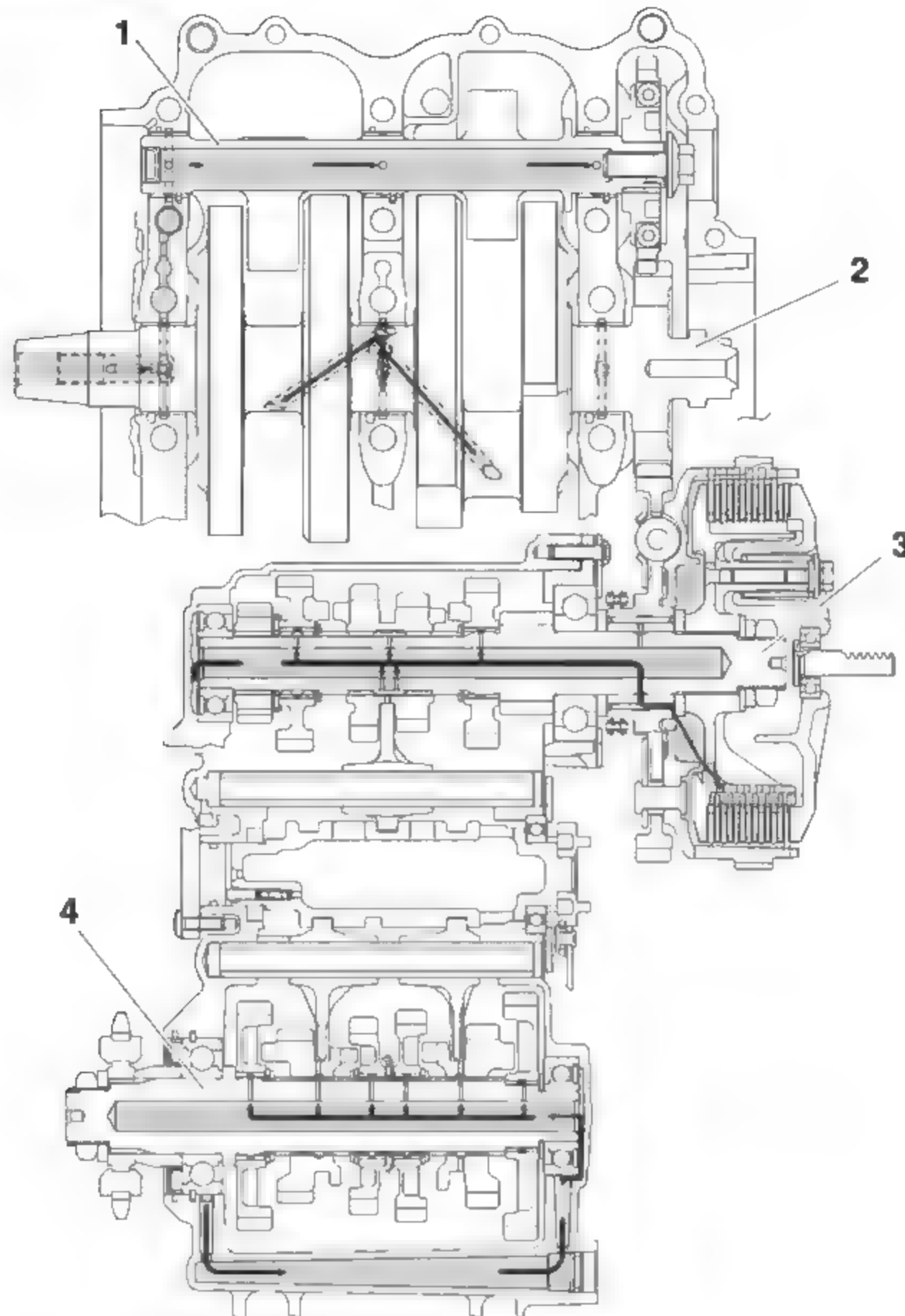
Crankshaft (front view)



- 1. Oil nozzle
- 2. Piston
- 3. Crankshaft
- 4. Main gallery

LUBRICATION SYSTEM CHART AND DIAGRAMS

Crankshaft and transmission (top view)



1. Balancer shaft assembly
2. Crankshaft
3. Main axle
4. Drive axle

EAS20041

ENGINE INSPECTION

EAS20249

MEASURE THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:

- Valve clearance
Out of specification → Adjust.
Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-7.

2. Start the engine, warm it up for several minutes, and then turn it off.

3. Remove:

- Ignition coils
Refer to "CHECKING THE SPARK PLUGS" on page 3-5.

4. Remove:

- Spark plugs

ECA13340

NOTICE

Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.

5. Install:

- Extension "1"
- Compression gauge "2"



Compression gauge extension
122mm

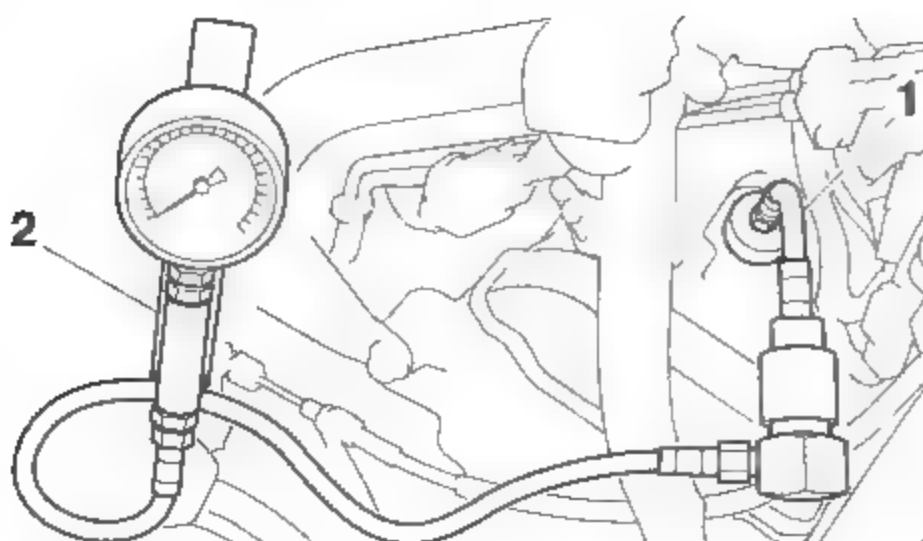
90890-04136

Compression gauge extension
122mm

YM-04136

Compression gauge
90890-03081

Engine compression tester
YU-33223



6. Measure:

- Compression pressure
Out of specification → Refer to steps (c) and (d).

TIP

Due to the engine characteristics, the compression pressure is different for cylinder #1 and cylinder #2.



Compression pressure (#1 cylinder)

765–985 kPa/355 r/min (7.7–9.9 kgf/cm²/355 r/min, 108.9–140.2 psi/355 r/min)

Compression pressure (#2 cylinder)

687–884 kPa/355 r/min (6.9–8.8 kgf/cm²/355 r/min, 97.8–125.8 psi/355 r/min)

- Turn the main switch to "ON".
- With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

EWA12940

WARNING

To prevent sparking, ground all spark plug leads before cranking the engine.

TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 14 psi).

- If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
Carbon deposits → Eliminate.
- If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
Refer to the following table.

Compression pressure (with oil applied into the cylinder)	
Reading	Diagnosis
Higher than without oil	Piston ring(s) wear or damage → Repair.
Same as without oil	Pistons, valves, cylinder head gasket or piston ring(s) possibly defective → Repair.

7. Install:

- Spark plugs
- Ignition coils

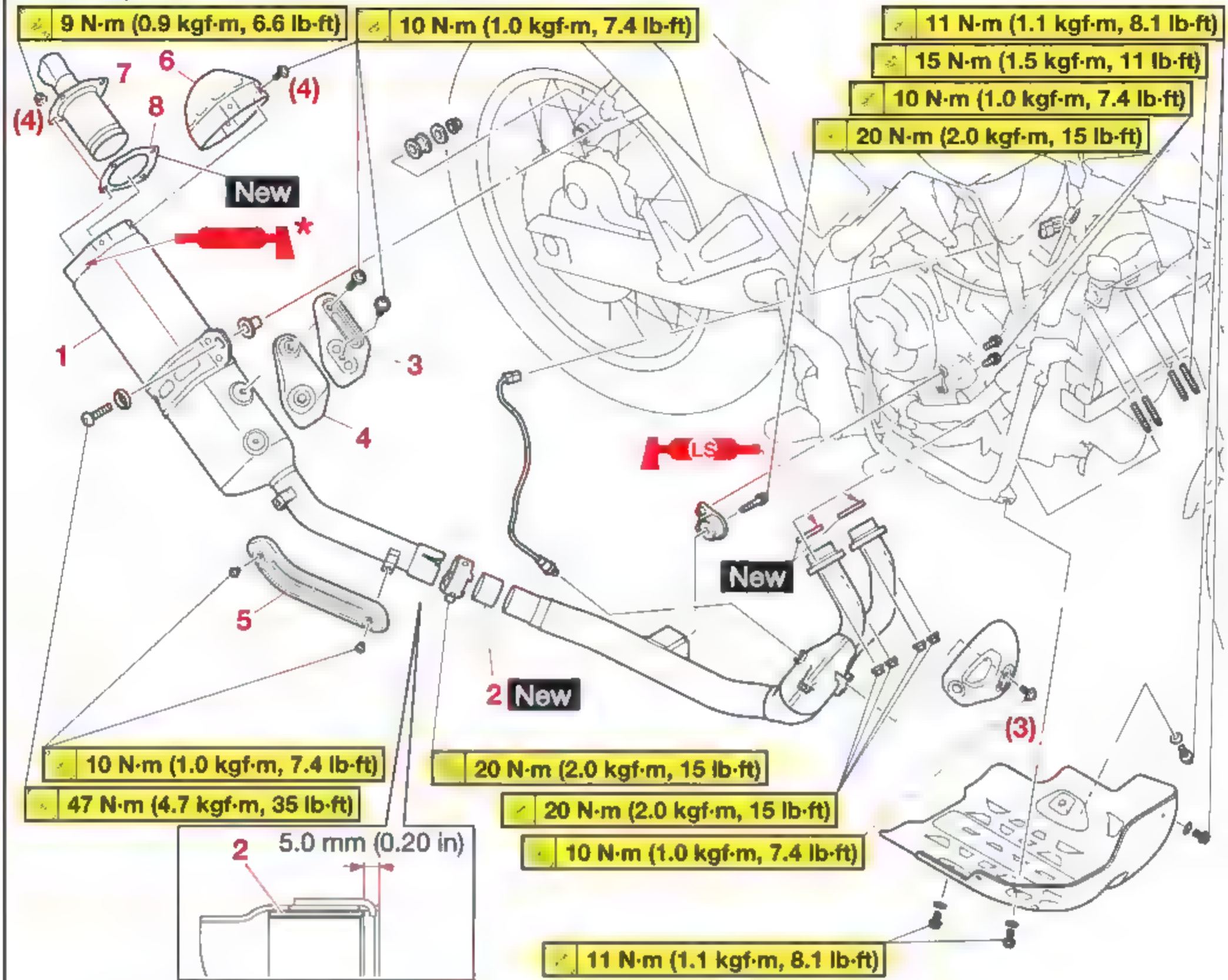


Spark plug
13 N·m (1.3 kgf·m, 9.6 lb·ft)

EAS20042

ENGINE REMOVAL

Removing the exhaust pipe

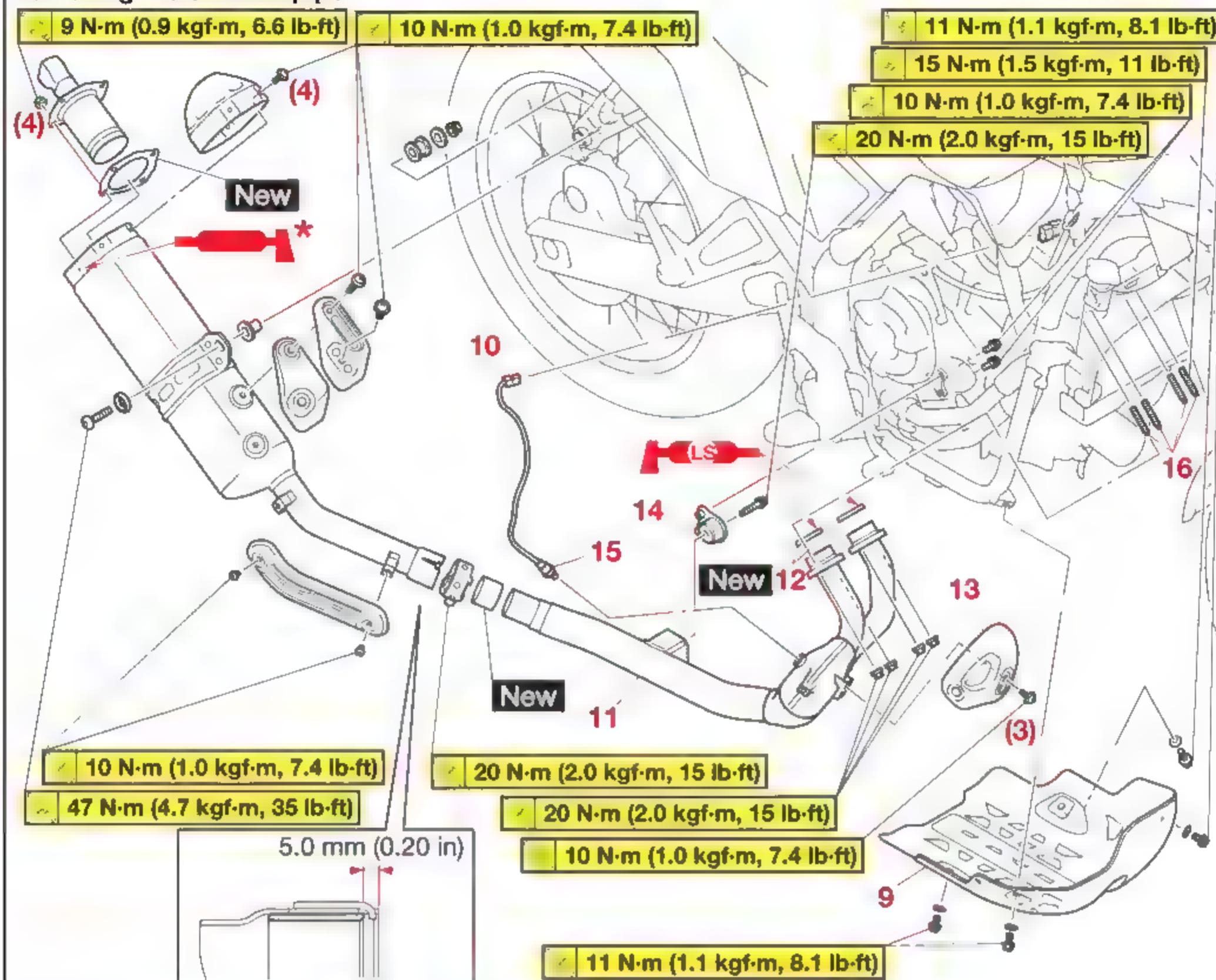


*Apply LOCTITE® LB 8009 Heavy Duty Anti-Seize.

Order	Job/Parts to remove	Q'ty	Remarks
	Air scoop (right)/Air duct (right)		Refer to "GENERAL CHASSIS (3)" on page 4-5.
1	Muffler	1	
2	Gasket	1	
3	Muffler protector 2	1	
4	Muffler protector 3	1	
5	Muffler protector 1	1	
6	Muffler cap	1	
7	Tailpipe	1	
8	Gasket	1	

ENGINE REMOVAL

Removing the exhaust pipe

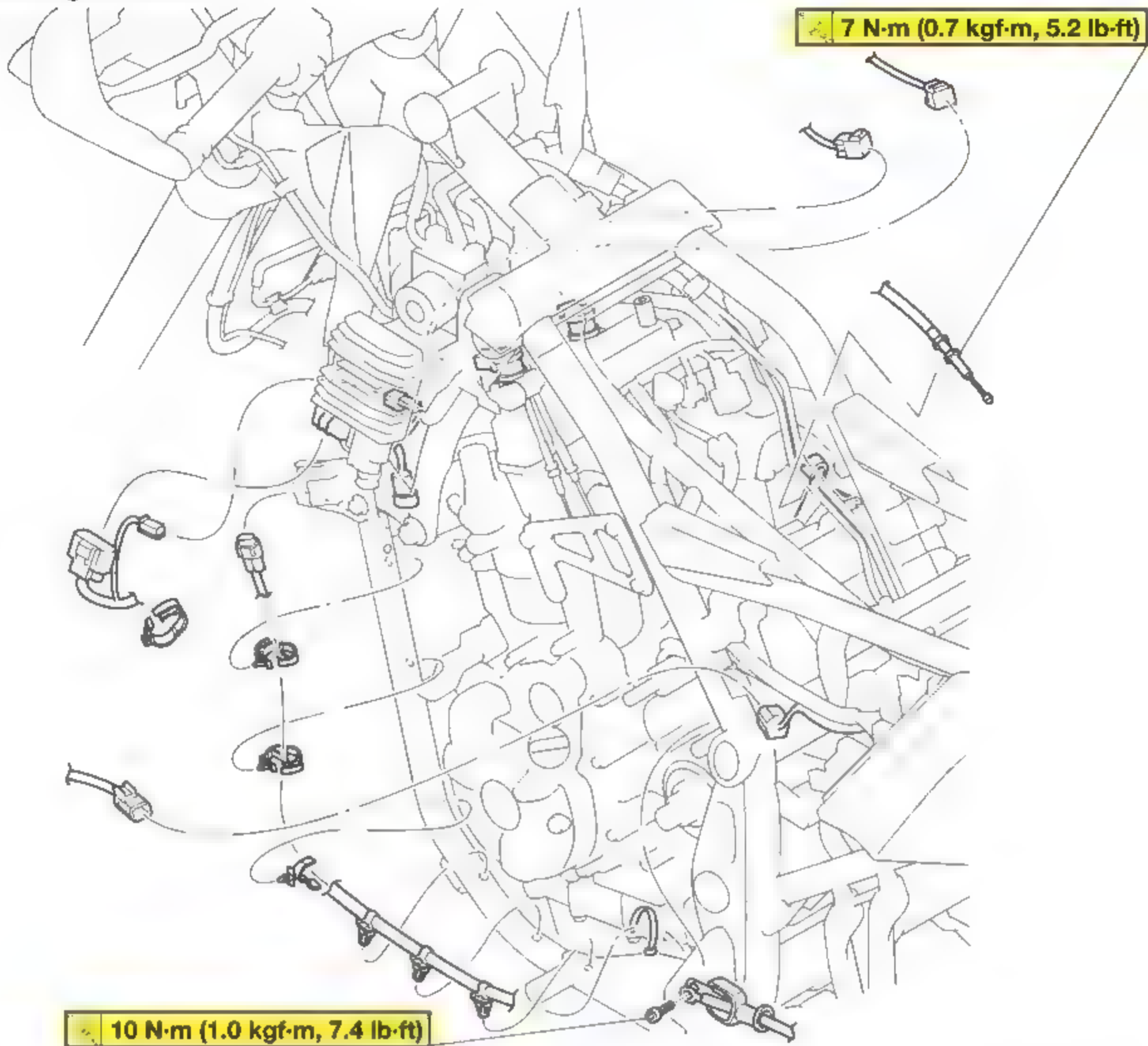


***Apply LOCTITE® LB 8009 Heavy Duty Anti-Seize.**

Order	Job/Parts to remove	Q'ty	Remarks
9	Engine guard	1	
10	O ₂ sensor coupler	1	Disconnect.
11	Exhaust pipe	1	
12	Gasket	2	
13	Exhaust pipe protector	1	
14	Exhaust pipe bracket	1	
15	O ₂ sensor	1	Remove the O ₂ sensor only when necessary.
16	Stud bolt	4	

ENGINE REMOVAL

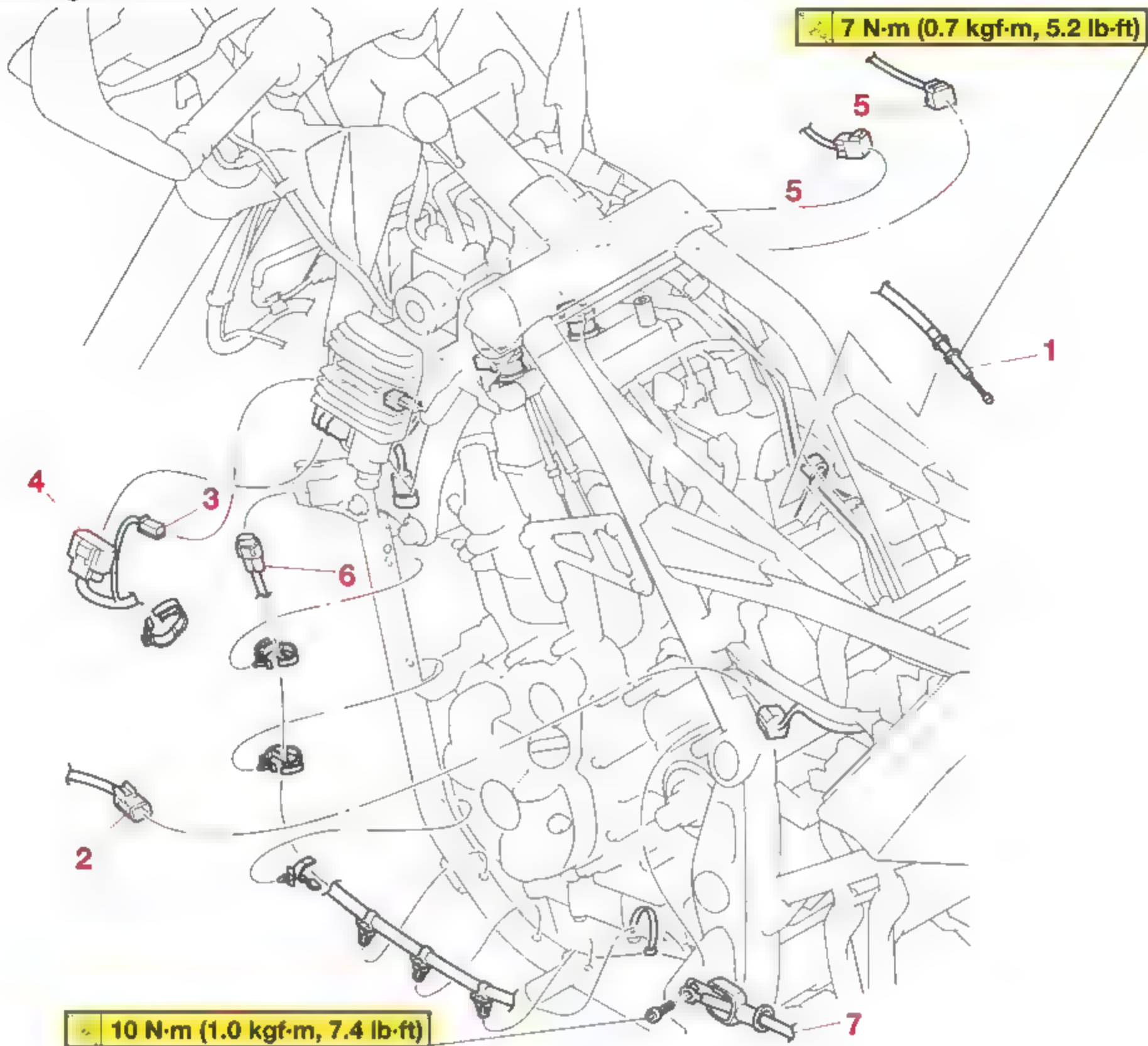
Disconnecting the leads



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-28.
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Side covers		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Air scoop (left)/Air duct (left)/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank/Canister		Refer to "FUEL TANK" on page 7-1.
	Drive sprocket		Refer to "CHAIN DRIVE" on page 4-87.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-48.
	Oil pressure switch		Refer to "CRANKCASE" on page 5-70.
	Coolant reservoir/Radiator		Refer to "RADIATOR" on page 6-2.
	Water jacket joint/Oil cooler/Thermostat		Refer to "OIL COOLER" on page 6-5.
	Water pump		Refer to "WATER PUMP" on page 6-9.

ENGINE REMOVAL

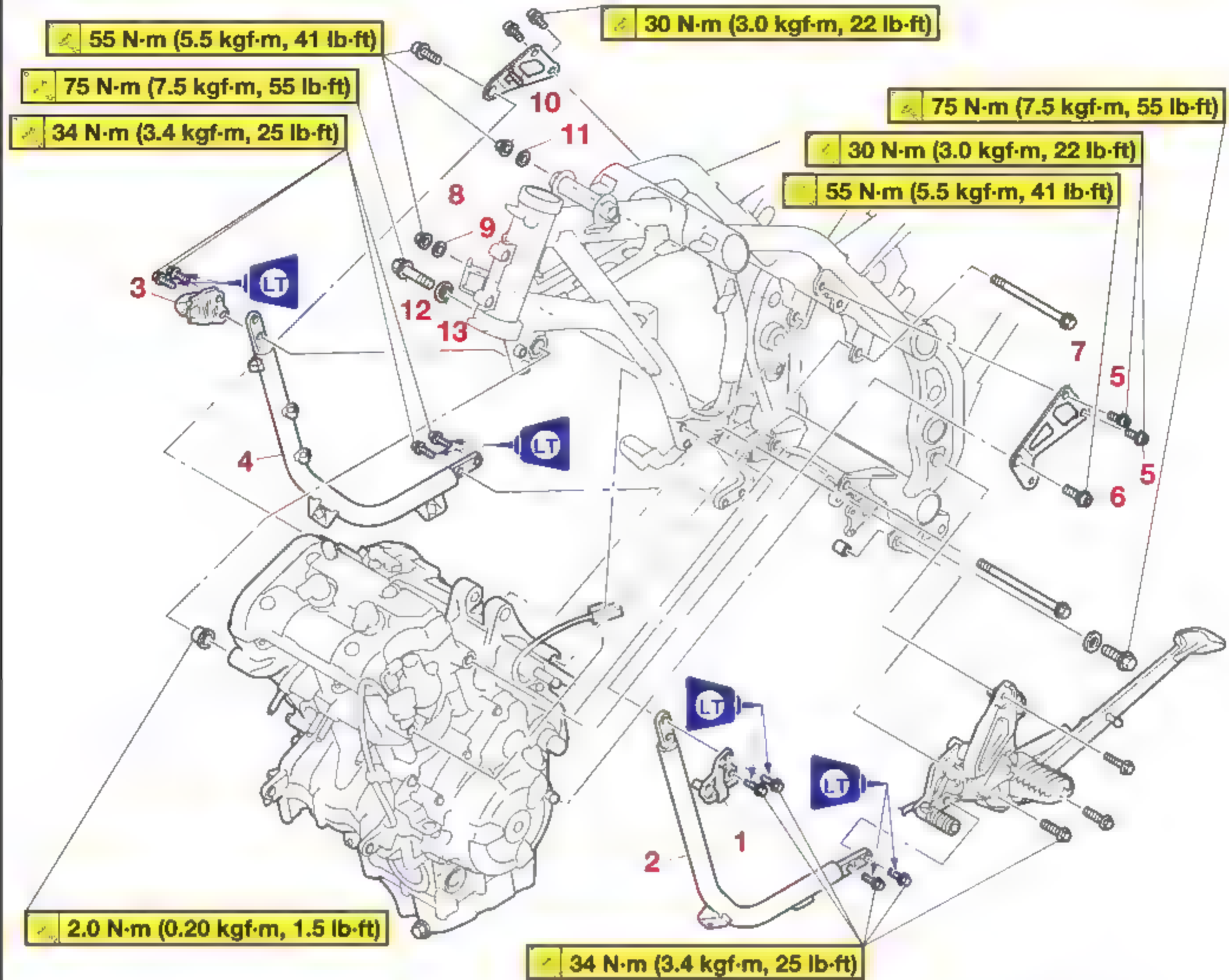
Disconnecting the leads



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head breather hose/Sub-wire harness/Throttle bodies		Refer to "THROTTLE BODIES" on page 7-6.
1	Clutch cable	1	Disconnect.
2	Gear position sensor coupler	1	Disconnect.
3	Crankshaft position sensor coupler	1	Disconnect.
4	Stator coil coupler	1	Disconnect.
5	Ignition coil coupler	2	Disconnect.
6	Sidestand switch coupler and lead	1	Disconnect the coupler and then remove the lead from the down tube (left).
7	Engine ground lead	1	Disconnect.

ENGINE REMOVAL

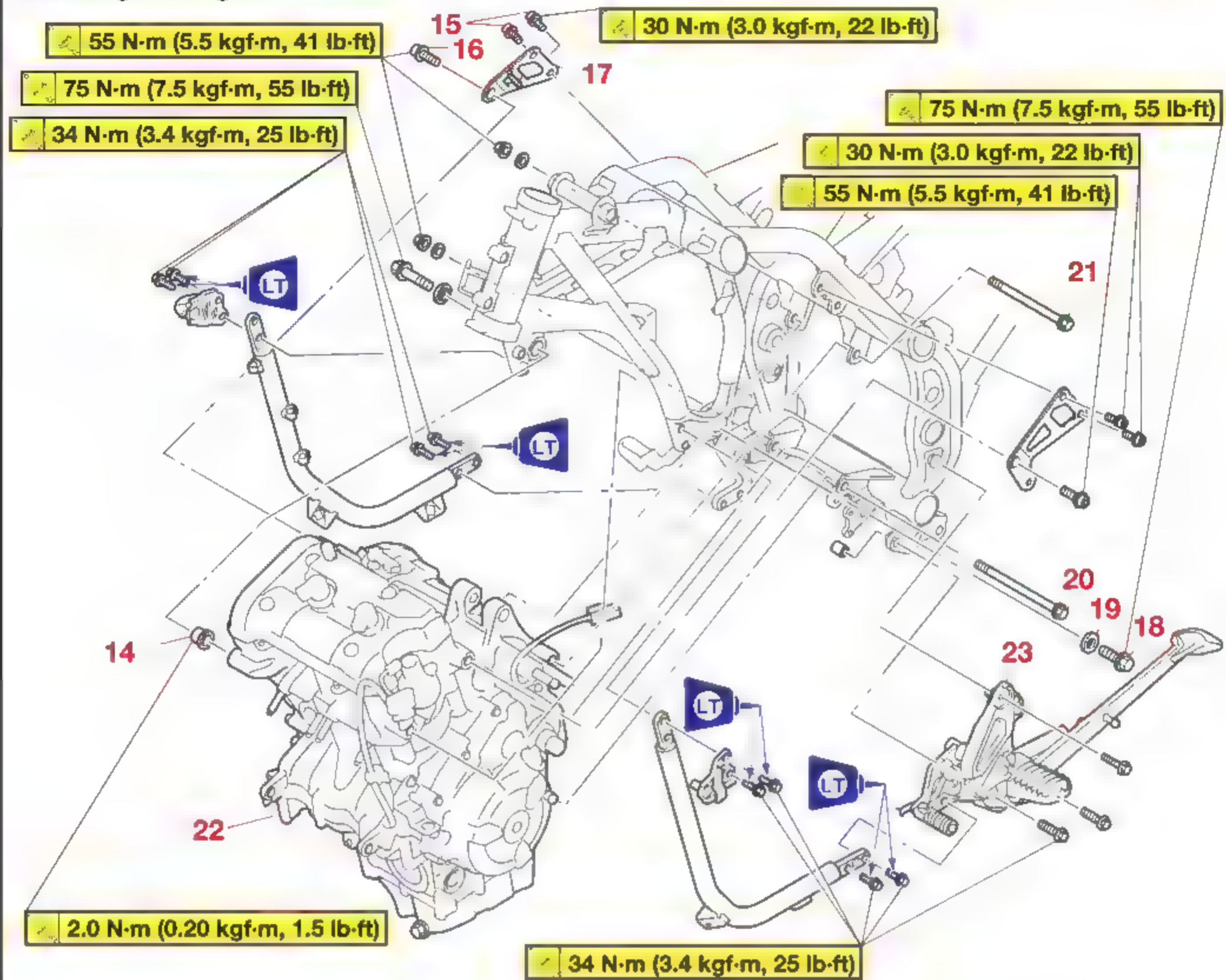
Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
1	Radiator bracket (left)	1	
2	Down tube (left)	1	
3	Radiator bracket (right)	1	
4	Down tube (right)	1	
5	Engine bracket bolt (left)	2	
6	Engine mounting bolt (left upper side)	1	
7	Engine bracket (left)	1	
8	Engine mounting nut (rear lower side)	1	
9	Washer	1	
10	Engine mounting nut (rear upper side)	1	
11	Washer	1	
12	Engine mounting bolt (front right side)	1	
13	Collar	1	

ENGINE REMOVAL

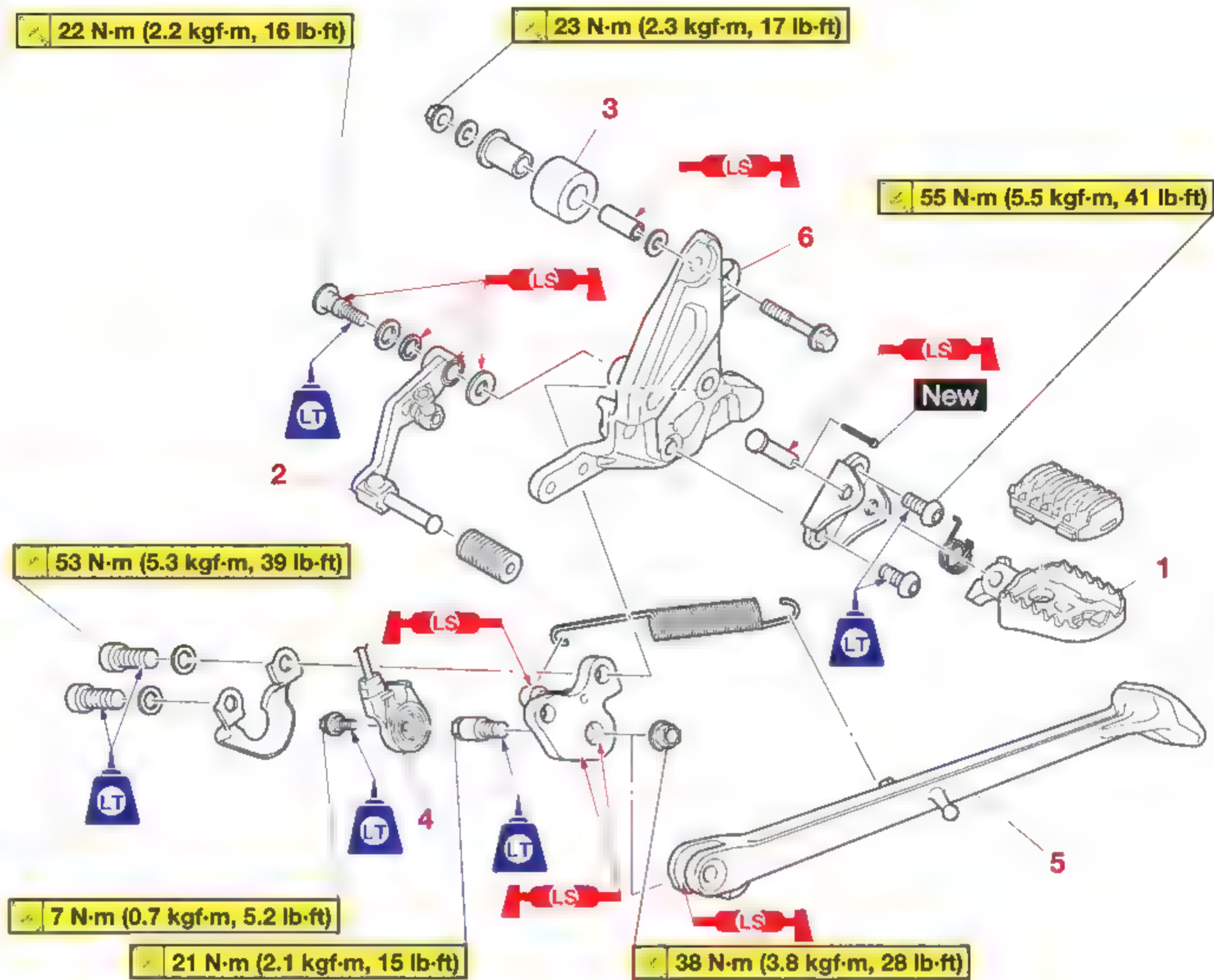
Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
14	Engine mounting adjust bolt	1	Loosen. TIP _____ Turn the bolt counterclockwise using a 1/2 inch hexagon bit socket.
15	Engine bracket bolt (right)	2	
16	Engine mounting bolt (right upper side)	1	
17	Engine bracket (right)	1	
18	Engine mounting bolt (front left side)	1	
19	Washer	1	
20	Engine mounting bolt (rear lower side)	1	
21	Engine mounting bolt (rear upper side)	1	
22	Engine	1	
23	Footrest assembly (left)	1	

ENGINE REMOVAL

Disassembling the footrest assembly (left)



Order	Job/Parts to remove	Q'ty	Remarks
1	Footrest (left)	1	
2	Shift pedal	1	
3	Drive chain tensioner	1	
4	Sidestand switch	1	
5	Sidestand	1	
6	Footrest bracket (left)	1	

ENGINE REMOVAL

EAS30250

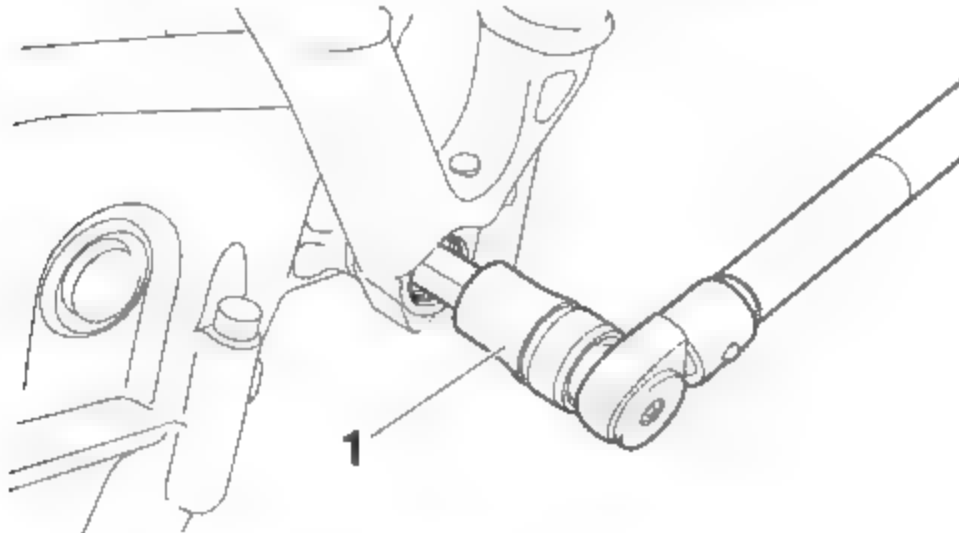
REMOVING THE ENGINE

1. Loosen:

- Engine mounting adjust bolt

TIP

Loosen the engine mounting adjust bolt using a 1/2 inch hexagon bit socket "1"



EAS30251

INSTALLING THE ENGINE

1. Install:

- Engine mounting adjust bolt "1"
- Engine "2"
- Engine mounting bolt (rear upper side) "3"
- Washer "4"
- Engine mounting nut (rear upper side) "5"
- Engine mounting bolt (rear lower side) "6"
- Washer "7"
- Engine mounting nut (rear lower side) "8"
- Washer "9"
- Engine mounting bolt (front left side) "10"
- Engine bracket (right) "11"
- Engine mounting bolt (right upper side) "12"
- Engine bracket bolts (right) "13"

TIP

Temporarily tighten the bolts and nuts.

2. Tighten:

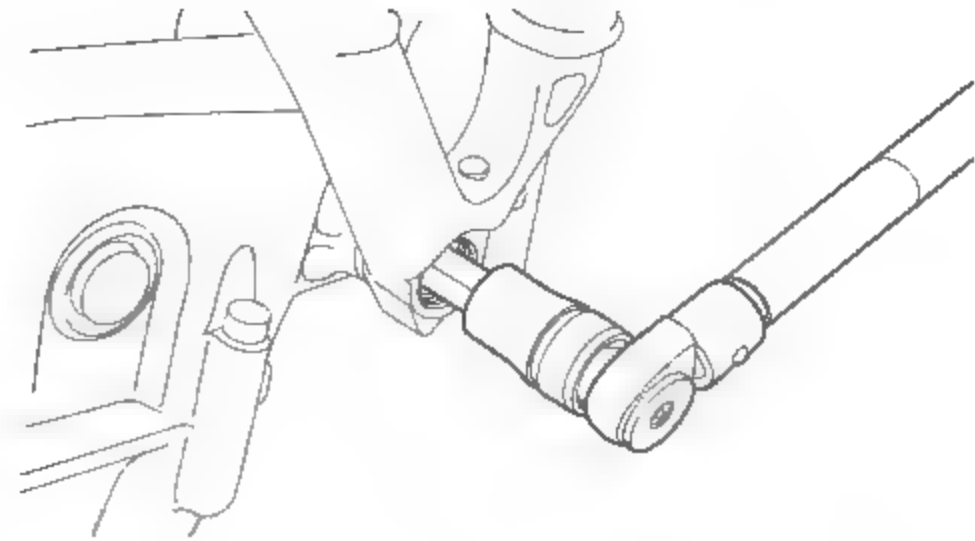
- Engine mounting adjust bolt "1"

TIP

- Tighten the engine mounting adjust bolt to specification with a 1/2 inch hexagon bit socket.
- Make sure that the flange of the engine mounting adjust bolt contacts the engine.



Engine mounting adjust bolt
2.0 N·m (0.20 kgf·m, 1.5 lb·ft)



3. Install:

- Collar "14"
- Engine mounting bolt (front right side) "15"

TIP

Temporarily tighten the bolt.

4. Tighten:

- Engine mounting nut (rear upper side) "5"



Engine mounting nut (rear upper side)
55 N·m (5.5 kgf·m, 41 lb·ft)

5. Tighten:

- Engine mounting nut (rear lower side) "8"



Engine mounting nut (rear lower side)
55 N·m (5.5 kgf·m, 41 lb·ft)

6. Tighten:

- Engine mounting bolt (front left side) "10"



Engine mounting bolt (front left side)
75 N·m (7.5 kgf·m, 55 lb·ft)

7. Install:

- Engine bracket (left) "16"
- Engine mounting bolt (left upper side) "17"
- Engine bracket bolts (left) "18"

TIP

Temporarily tighten the bolts.

8. Tighten:

- Engine mounting bolt (left upper side) "17"



Engine mounting bolt (left upper side)
55 N·m (5.5 kgf·m, 41 lb·ft)

9. Tighten:

- Engine mounting bolt (right upper side) "12"

ENGINE REMOVAL



Engine mounting bolt (right upper side)
55 N·m (5.5 kgf·m, 41 lb·ft)

10. Tighten:

- Engine bracket bolts (left and right) "13", "18"



Engine bracket bolts
30 N·m (3.0 kgf·m, 22 lb·ft)

TIP

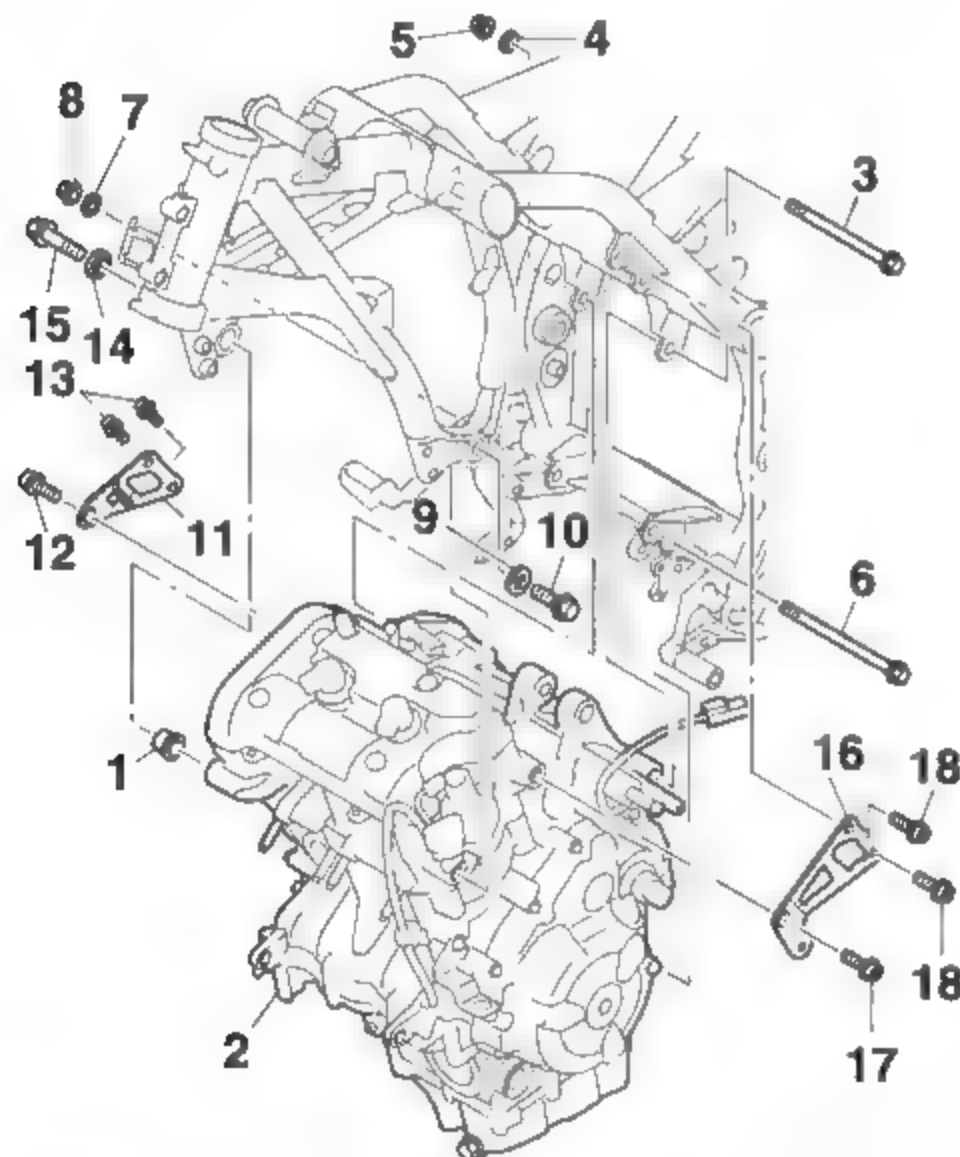
Tighten the engine bracket bolts in any order.

11. Tighten:

- Engine mounting bolt (front right side) "15"



Engine mounting bolt (front right side)
75 N·m (7.5 kgf·m, 55 lb·ft)



EAS30252

INSTALLING THE EXHAUST PIPE AND MUFFLER

1. Install:

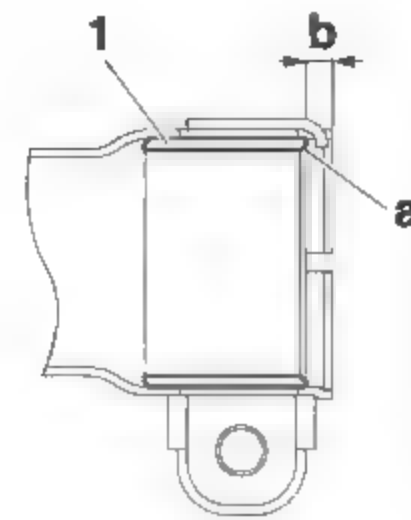
- Gasket "1" **New**
(to the muffler)

TIP

Install the gasket with the chamfer "a", located on an inner rim of the gasket, as shown in the illustration.



Installed depth of gasket "b"
5.0 mm (0.20 in)

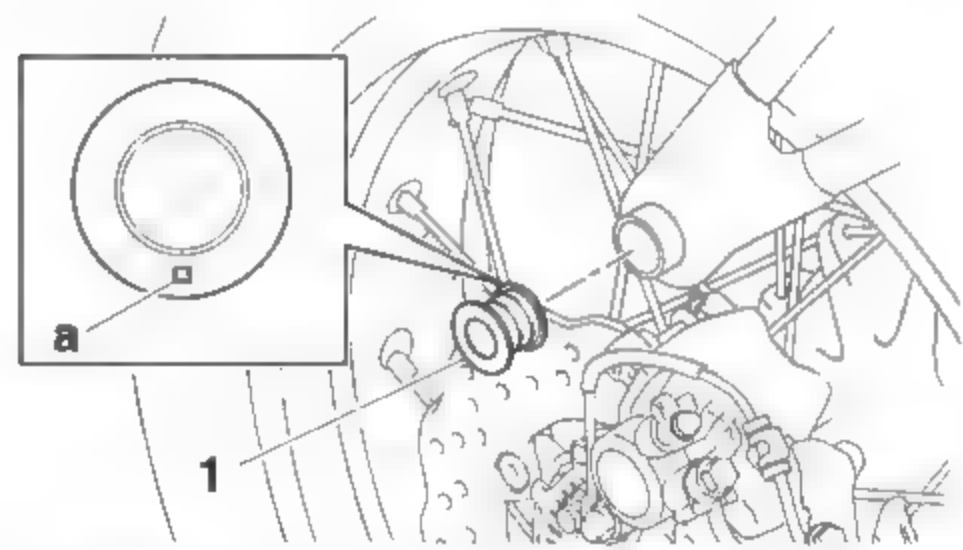


2. Install:

- Damper "1"
(to the frame)

TIP

Install the damper with the mark "a" facing rear wheel side.

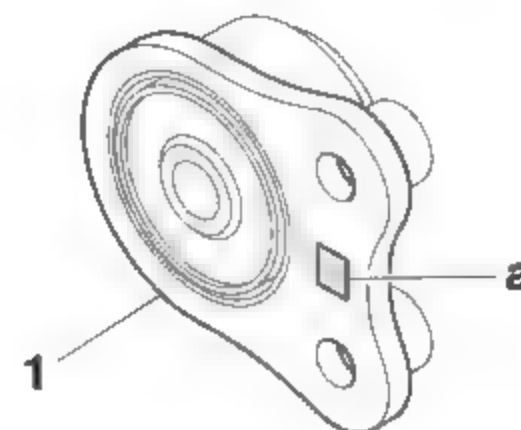


3. Install:

- Exhaust pipe bracket "1"
(to the frame)

TIP

Install the exhaust pipe bracket with the mark "a" facing the left side of the vehicle.



EAS32289

CLEANING THE SPARK ARRESTER

1. Remove:

- Tailpipe
- Gasket

Refer to "ENGINE REMOVAL" on page 5-10.

ENGINE REMOVAL

2. Clean:

- Spark arrester

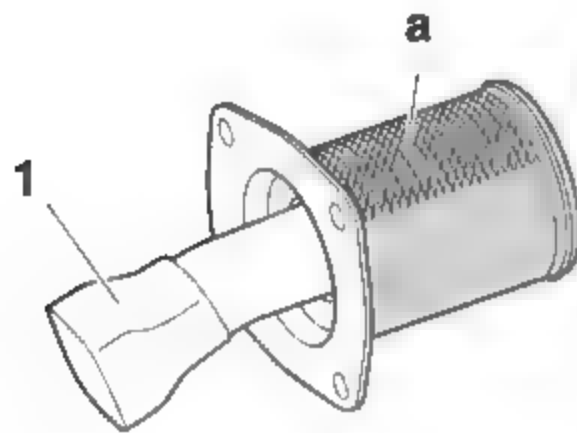
EWA14680



WARNING

- Select a well-ventilated area free of combustible materials.
- Always let the exhaust system cool before performing this operation.
- Do not start the engine when removing the tailpipe from the muffler.

- a. Tap the tailpipe "1" lightly with a soft-face hammer or suitable tool, then use a wire brush to remove any carbon deposits from the spark arrester portion "a" of the tailpipe and the inner contact surfaces of the muffler.

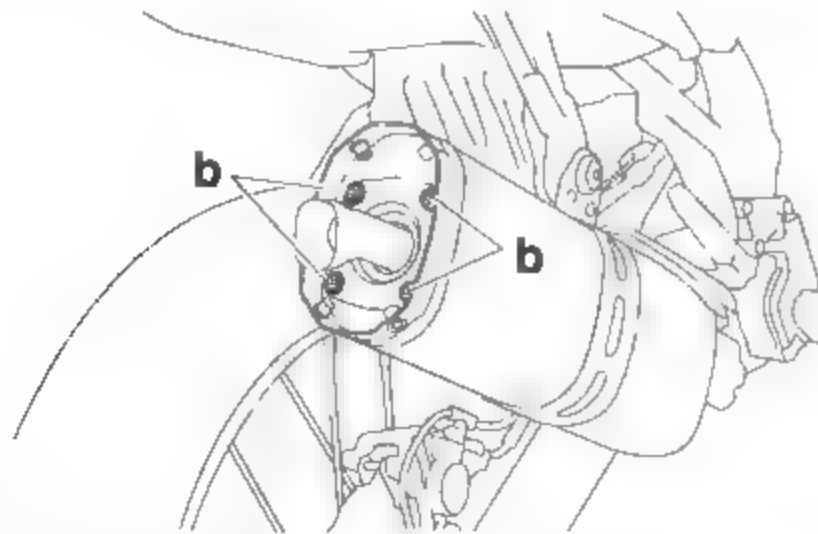


3. Install:

- Gasket **New**
- Tailpipe
- Tailpipe nuts

TIP

Lubricate the bolt portion "b" of the muffler with the recommended lubricant.



Recommended lubricant
LOCTITE® LB 8009 Heavy Duty
Anti-Seize

4. Tighten:

- Tailpipe nuts

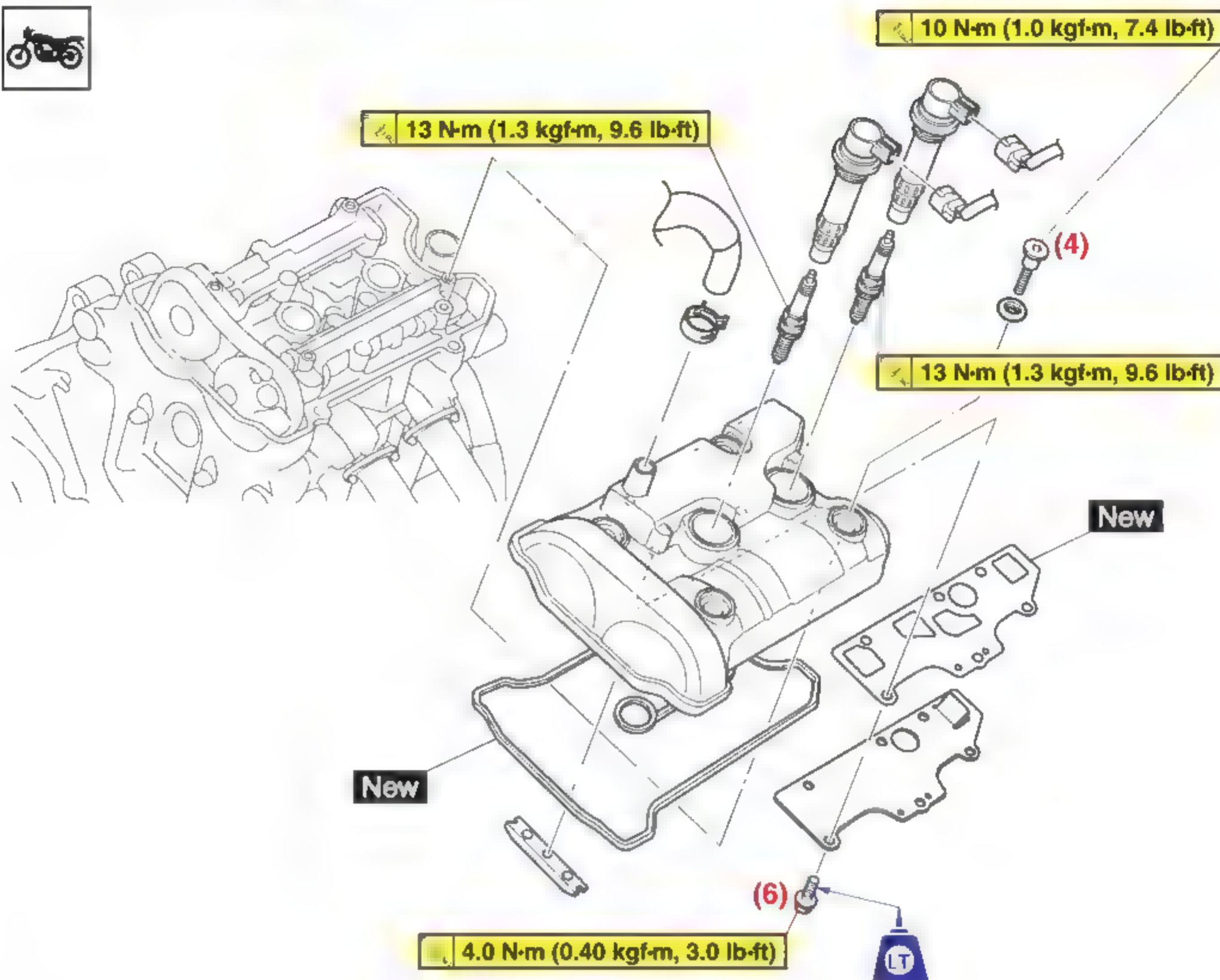


Tailpipe nut
9 N·m (0.9 kgf-m, 6.6 lb-ft)

EAS20043

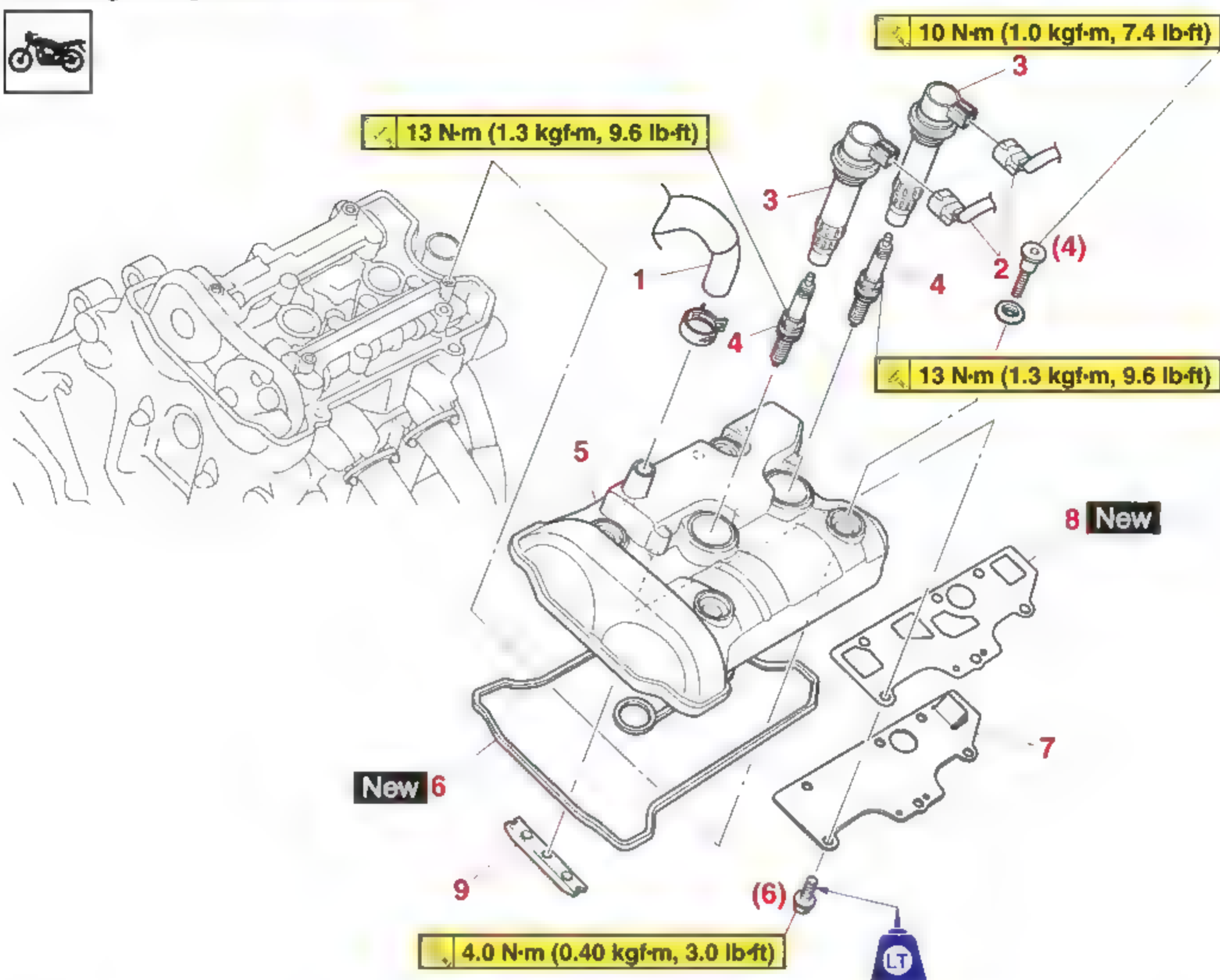
CAMSHAFTS

Removing the cylinder head cover



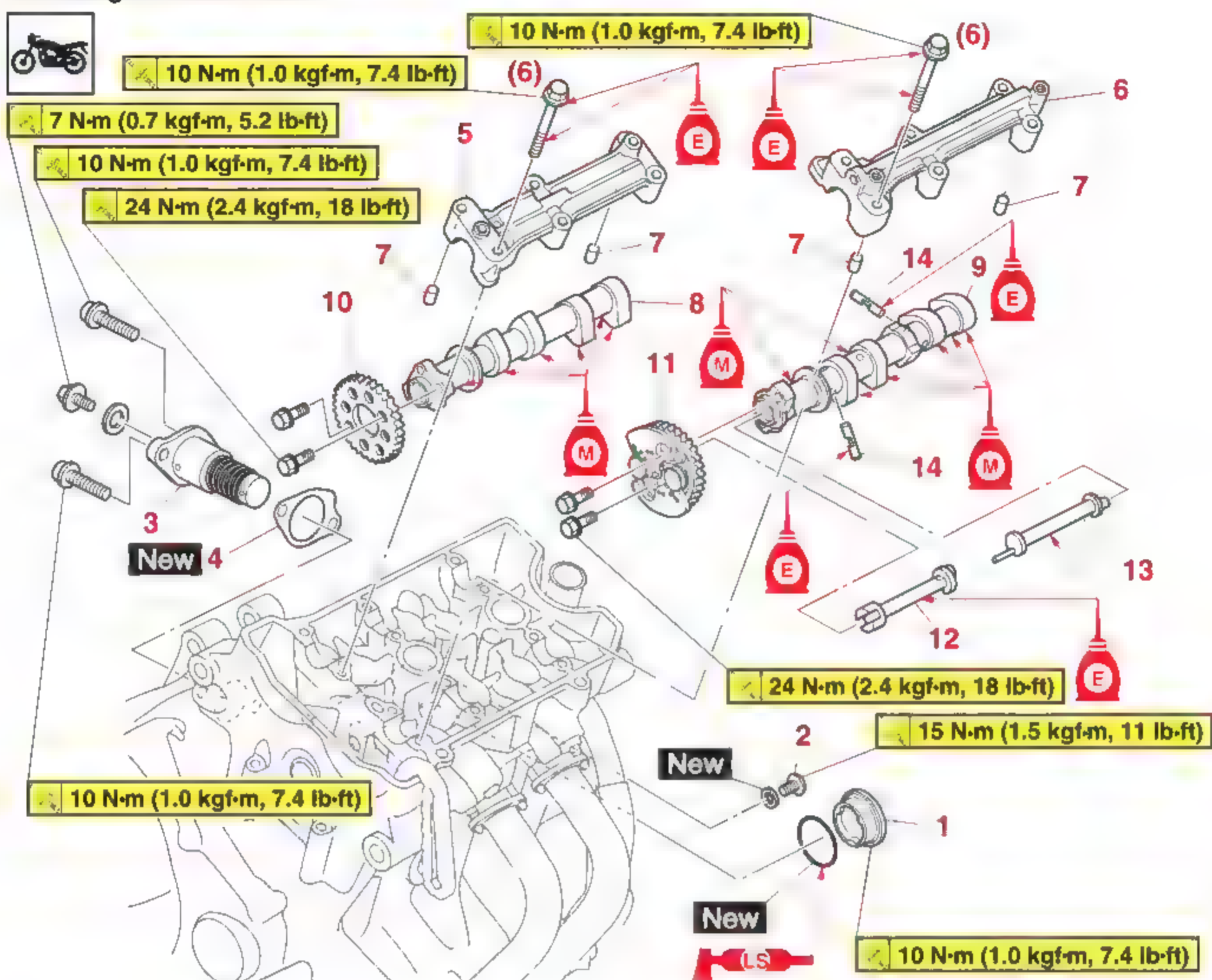
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoops/Air ducts/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-28.
	Radiator		Refer to "RADIATOR" on page 6-2.
	Throttle cables		Disconnect. Refer to "THROTTLE BODIES" on page 7-6.

Removing the cylinder head cover



Order	Job/Parts to remove	Q'ty	Remarks
1	Cylinder head breather hose	1	Disconnect.
2	Ignition coil coupler	2	Disconnect.
3	Ignition coil	2	
4	Spark plug	2	
5	Cylinder head cover	1	
6	Cylinder head cover gasket	1	
7	Breather plate	1	
8	Breather plate gasket	1	
9	Timing chain guide (upper side)	1	

Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
1	Crankshaft end cover	1	
2	Timing mark accessing bolt	1	
3	Timing chain tensioner	1	
4	Timing chain tensioner gasket	1	
5	Intake camshaft cap	1	
6	Exhaust camshaft cap	1	
7	Dowel pin	4	
8	Intake camshaft	1	
9	Exhaust camshaft	1	
10	Intake camshaft sprocket	1	
11	Exhaust camshaft sprocket	1	
12	Decompressor lever #2	1	
13	Decompressor lever #1	1	
14	Decompressor lever pin	2	

EAS33146

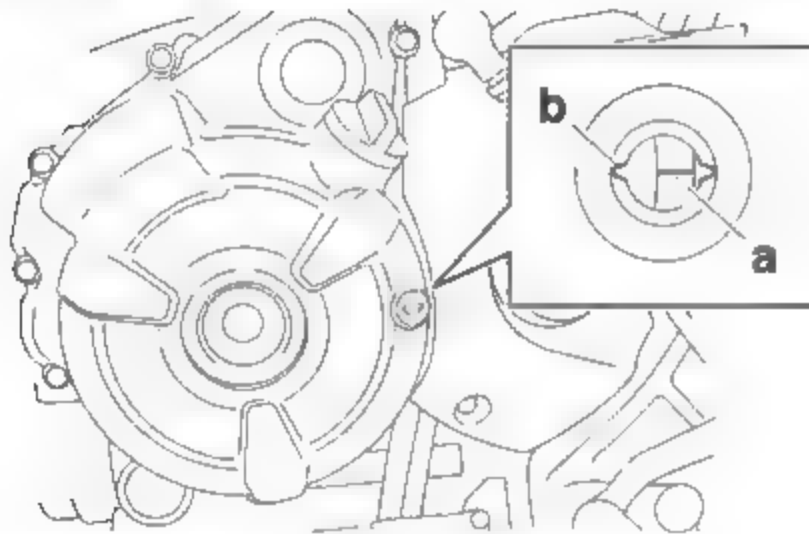
REMOVING THE IGNITION COILS

1. Remove:
 - Ignition coil
 Refer to "CHECKING THE SPARK PLUGS" on page 3-5.

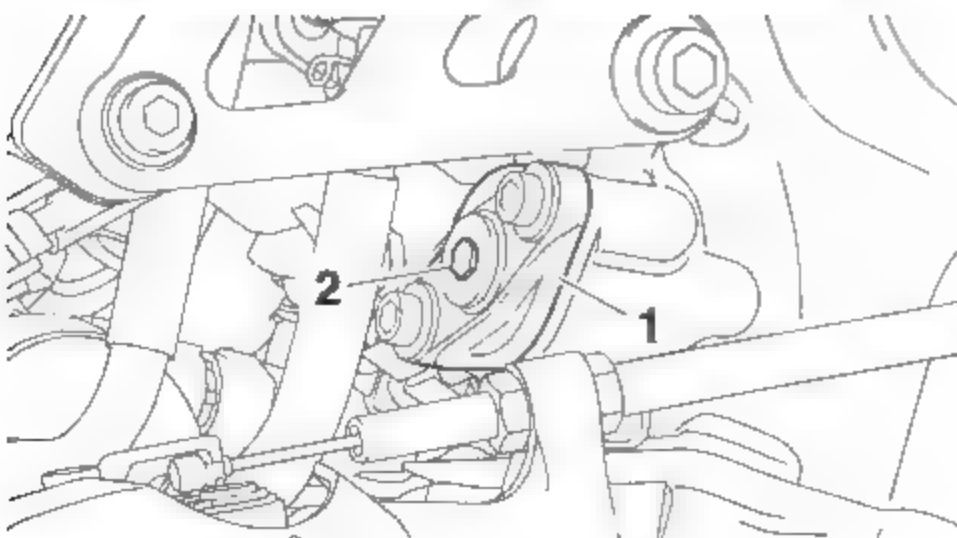
EAS30256

REMOVING THE CAMSHAFTS

1. Remove:
 - Crankshaft end cover
 - Timing mark accessing bolt
 Refer to "GENERATOR AND STARTER CLUTCH" on page 5-43.
2. Align:
 - Mark "a" on the generator rotor (with the slot "b" in the generator rotor cover)
 - a. Turn the crankshaft counterclockwise.
 - b. When piston #1 is at TDC on the exhaust stroke, align the TDC mark "a" on the generator rotor with the slot "b" in the generator rotor cover.



3. Remove:
 - Timing chain tensioner "1"
 - Timing chain tensioner gasket
 - a. Insert the hexagon wrench "2" (part No.: 1WS-12228-00) into the timing chain tensioner.
 - b. Remove the timing chain tensioner.



4. Remove:
 - Intake camshaft cap
 - Exhaust camshaft cap

ECA13720

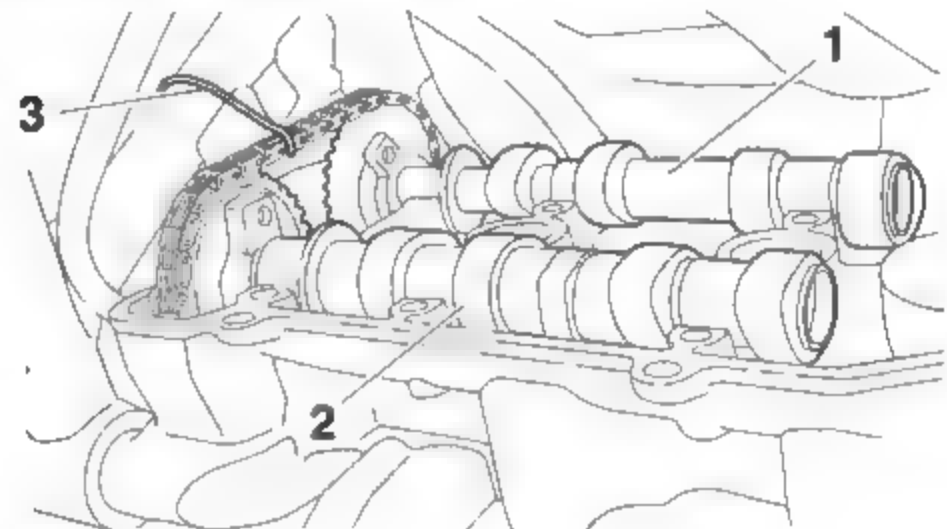
NOTICE

To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.

5. Remove:
 - Intake camshaft "1"
 - Exhaust camshaft "2"

TIP

To prevent the timing chain from falling into the crankcase, fasten it with a wire "3".



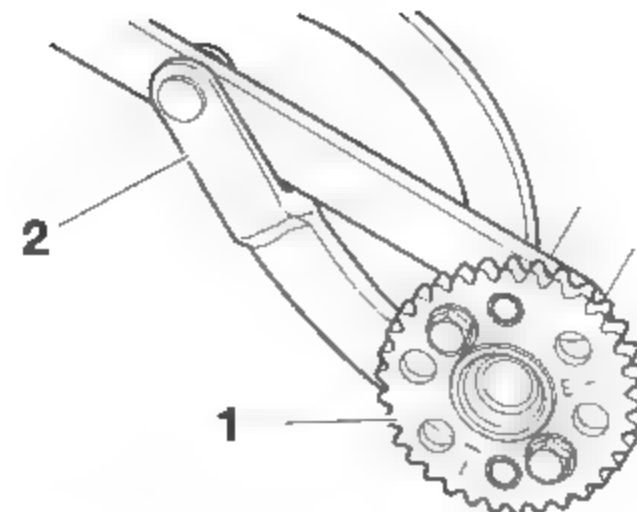
6. Remove:
 - Intake camshaft sprocket "1"

TIP

While holding the intake camshaft sprocket with the rotor holding tool "2", loosen the intake camshaft sprocket bolts.



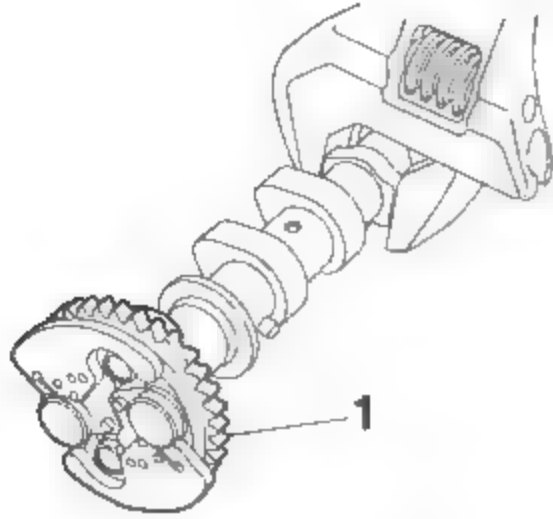
Rotor holding tool
90890-01235
Universal magneto and rotor holder
YU-01235



7. Remove:
 - Exhaust camshaft sprocket "1"

TIP

While holding the exhaust camshaft with a suitable tool, loosen the exhaust camshaft sprocket bolts.



EASS0257

CHECKING THE CAMSHAFTS

1. Check:

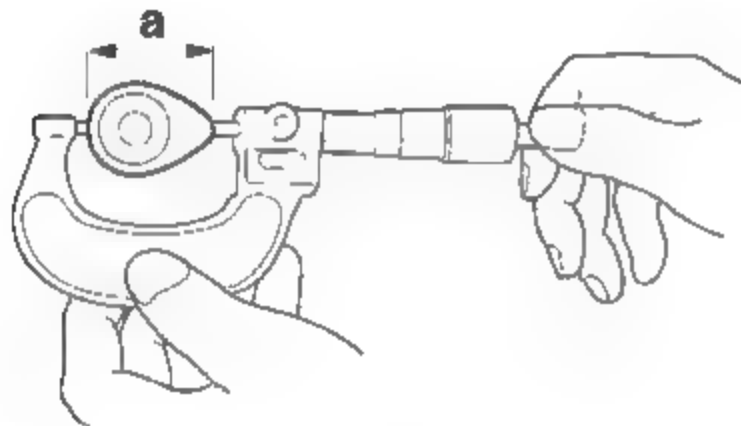
- Camshaft lobes
Blue discoloration/pitting/scratches → Replace the camshaft.

2. Measure:

- Camshaft lobe dimensions "a"
Out of specification → Replace the camshaft.



Camshaft lobe dimensions
Lobe height limit (Intake)
 35.510 mm (1.3980 in)
Lobe height limit (Exhaust)
 35.610 mm (1.4020 in)



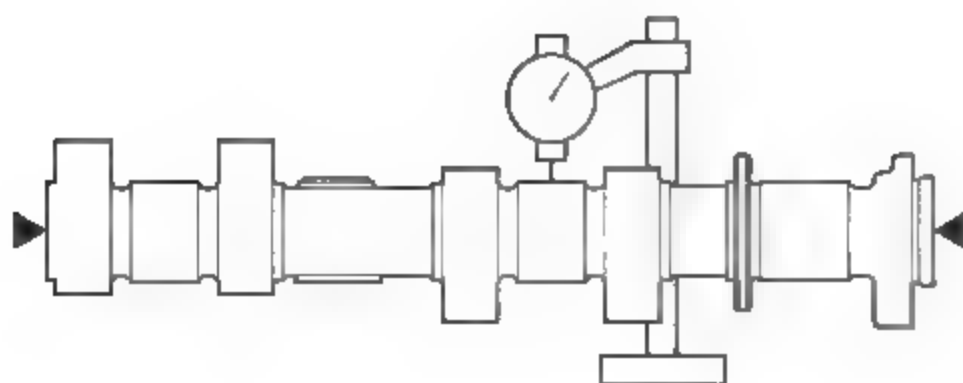
G088946

3. Measure:

- Camshaft runout
Out of specification → Replace.



Camshaft runout limit
 0.030 mm (0.0012 in)



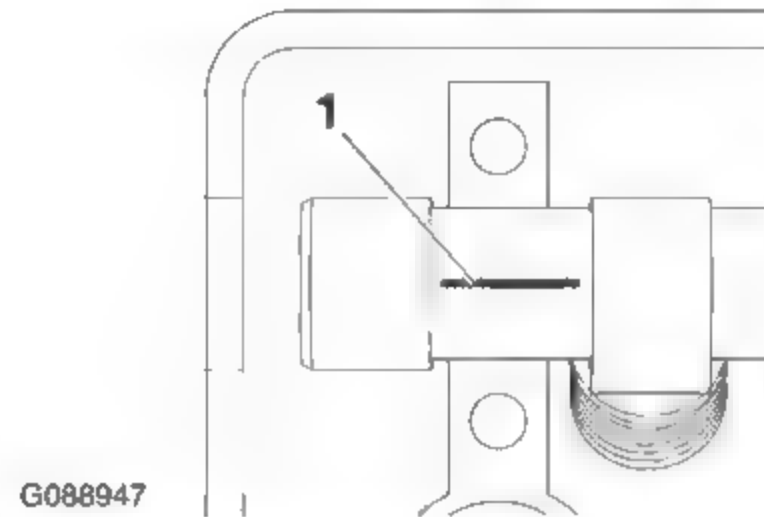
4. Measure:

- Camshaft-journal-to-camshaft-cap clearance
Out of specification → Measure the camshaft journal diameter.



Camshaft-journal-to-camshaft-cap clearance limit
 0.080 mm (0.0032 in)

- Install the camshafts into the cylinder head (without the camshaft caps).
- Position a strip of Plastigauge® "1" onto the camshaft journal as shown.



G088947

- Install the dowel pins and camshaft caps.

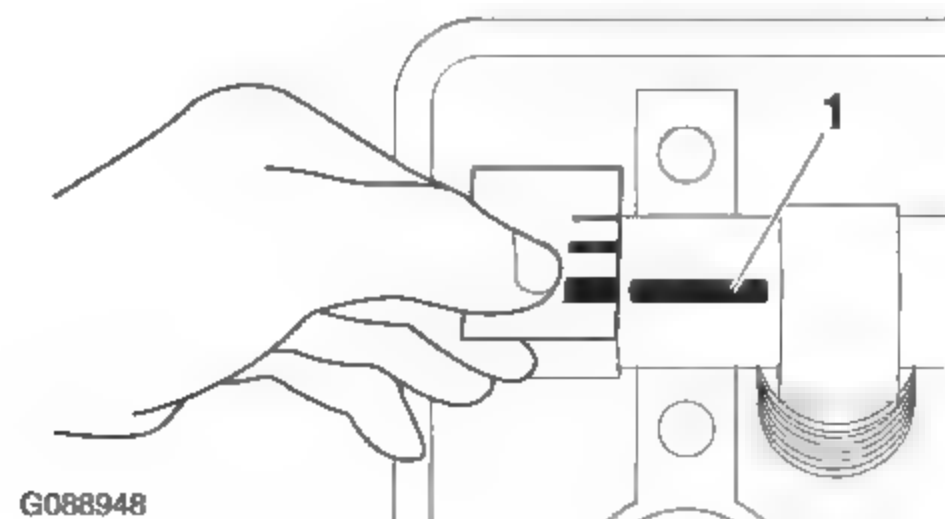
TIP

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.



Exhaust camshaft cap bolt
 10 N·m (1.0 kgf·m, 7.4 lb·ft)
Intake camshaft cap bolt
 10 N·m (1.0 kgf·m, 7.4 lb·ft)

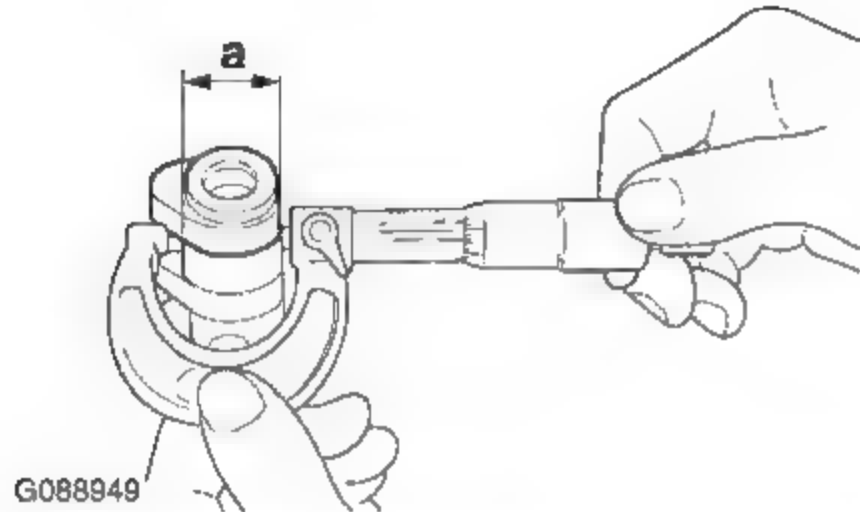
- Remove the camshaft caps, and then measure the width of the Plastigauge® "1".



G088948

5. Measure:

- Camshaft journal diameter "a"
Out of specification → Replace the camshaft.
Within specification → Replace the cylinder head and camshaft caps as a set.

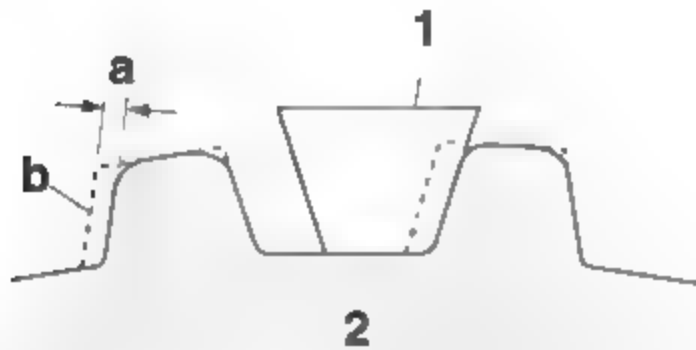


EAS30936

CHECKING THE CAMSHAFT SPROCKETS

1. Check:

- Camshaft sprocket
More than 1/4 tooth wear "a" → Replace the camshaft sprockets and timing chain as a set.



G088950

- a. 1/4 tooth
- b. Correct
- 1. Timing chain
- 2. Camshaft sprocket

EAS30260

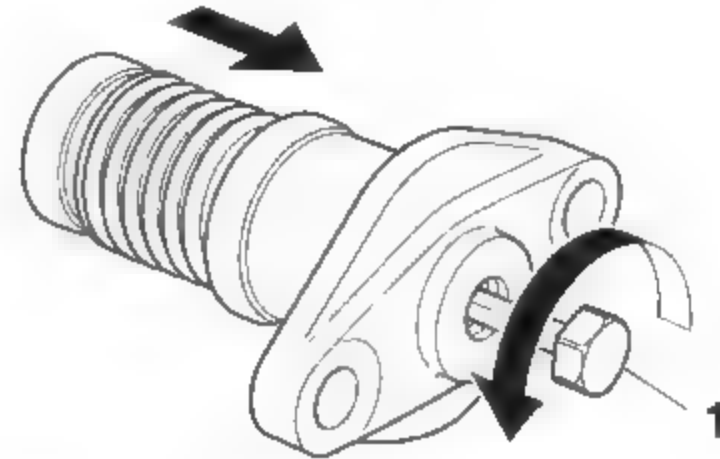
CHECKING THE TIMING CHAIN TENSIONER

1. Check:

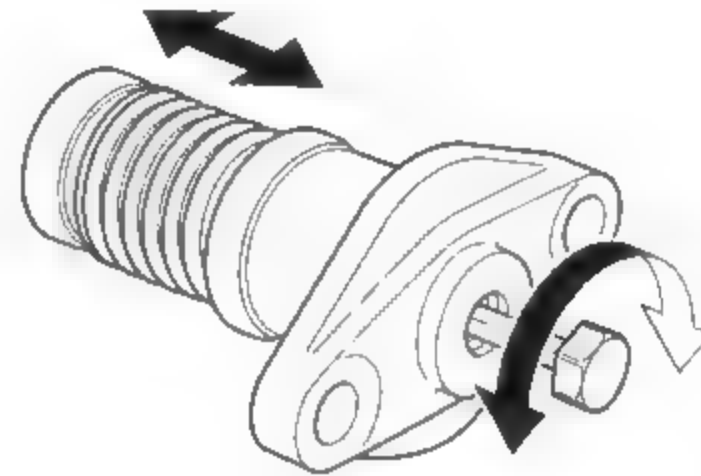
- Timing chain tensioner
Cracks/damage/rough movement → Replace.
a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

TIP

While pressing the timing chain tensioner rod, wind it counterclockwise with a hexagon wrench "1" (Parts No.: 1WS-12228-00) until it stops.



- b. Make sure that the timing chain tensioner rod moves in and out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.



EAS30267

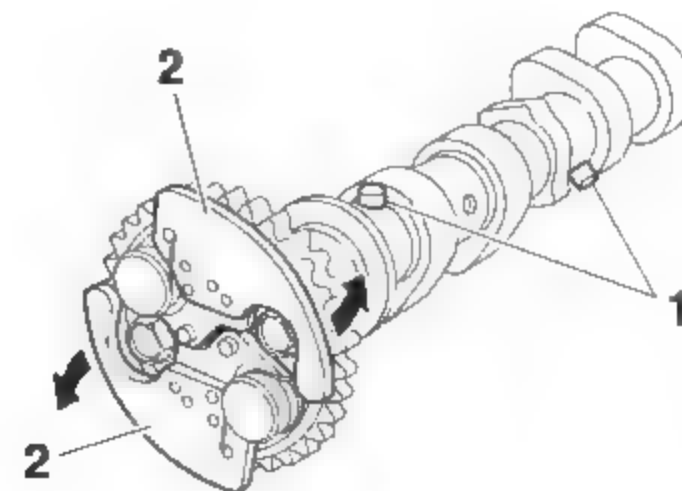
CHECKING THE DECOMPRESSION SYSTEM

1. Check:

- Decompression system

TIP

- Check that the decompressor lever pins "1" projects from the camshaft.
- Check that the decompressor cams "2" and decompressor lever pins "1" moves smoothly.

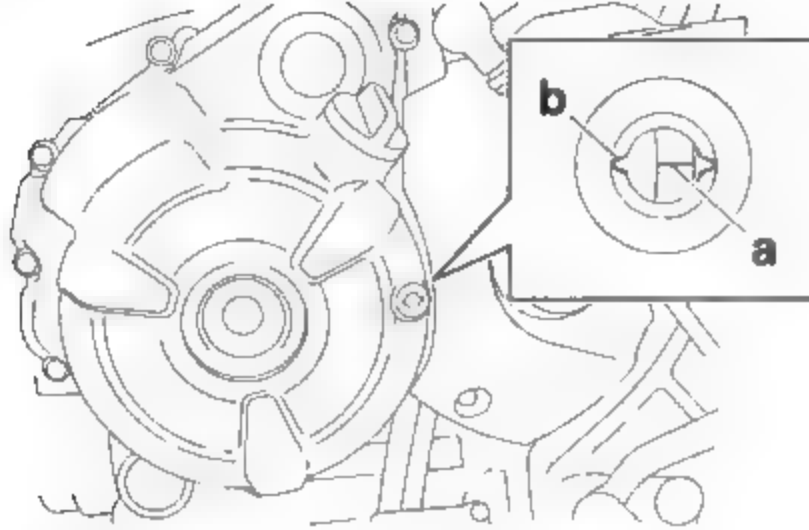


EAS30269

INSTALLING THE CAMSHAFTS

1. Align:

- Mark "a" on the generator rotor (with the slot "b" in the generator rotor cover)
 - a. Turn the crankshaft counterclockwise.
 - b. When piston #1 is at TDC, align the TDC mark "a" on the generator rotor with the slot "b" in the generator rotor cover.



2. Install:

- Intake camshaft sprocket "1"



Intake camshaft sprocket bolt
24 N·m (2.4 kgf·m, 18 lb·ft)

ECA19960

NOTICE

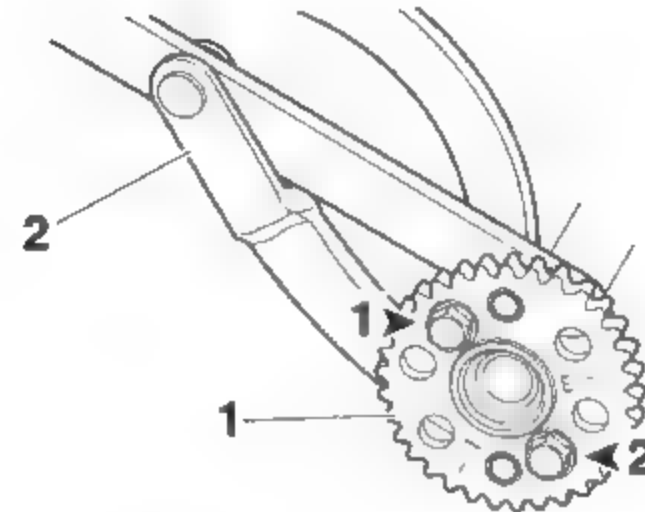
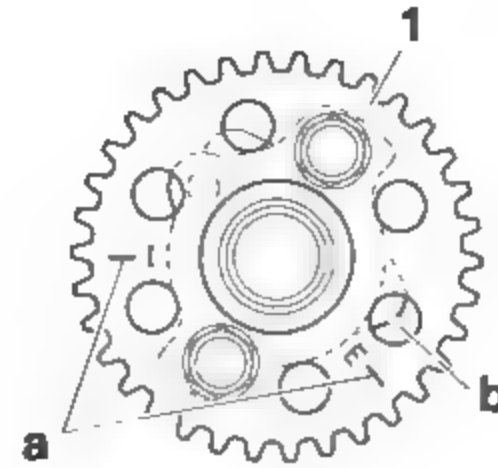
Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.

TIP

- Make sure that the marks "a" on the intake camshaft sprocket are aligned with cam lobe #1 "b" as shown in the illustration.
- While holding the intake camshaft sprocket with the rotor holding tool "2", tighten the intake camshaft sprocket bolts in the proper tightening sequence as shown.



Rotor holding tool
90890-01235
Universal magneto and rotor holder
YU-01235

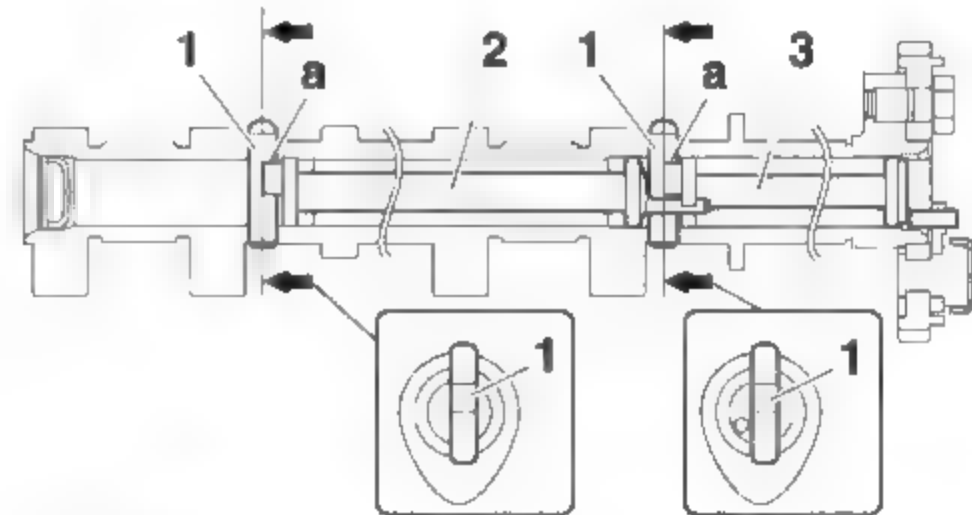


3. Install:

- Decompressor lever pins "1"
- Decompressor lever #1 "2"
- Decompressor lever #2 "3"

TIP

- Face the cutout "a" in each decompressor lever pin toward the exhaust camshaft sprocket.
- Install the decompressor lever pins, decompressor lever #1, and decompressor lever #2 into the exhaust camshaft as shown in the illustration.



4. Install:

- Exhaust camshaft sprocket "1"



Exhaust camshaft sprocket bolt
24 N·m (2.4 kgf·m, 18 lb·ft)

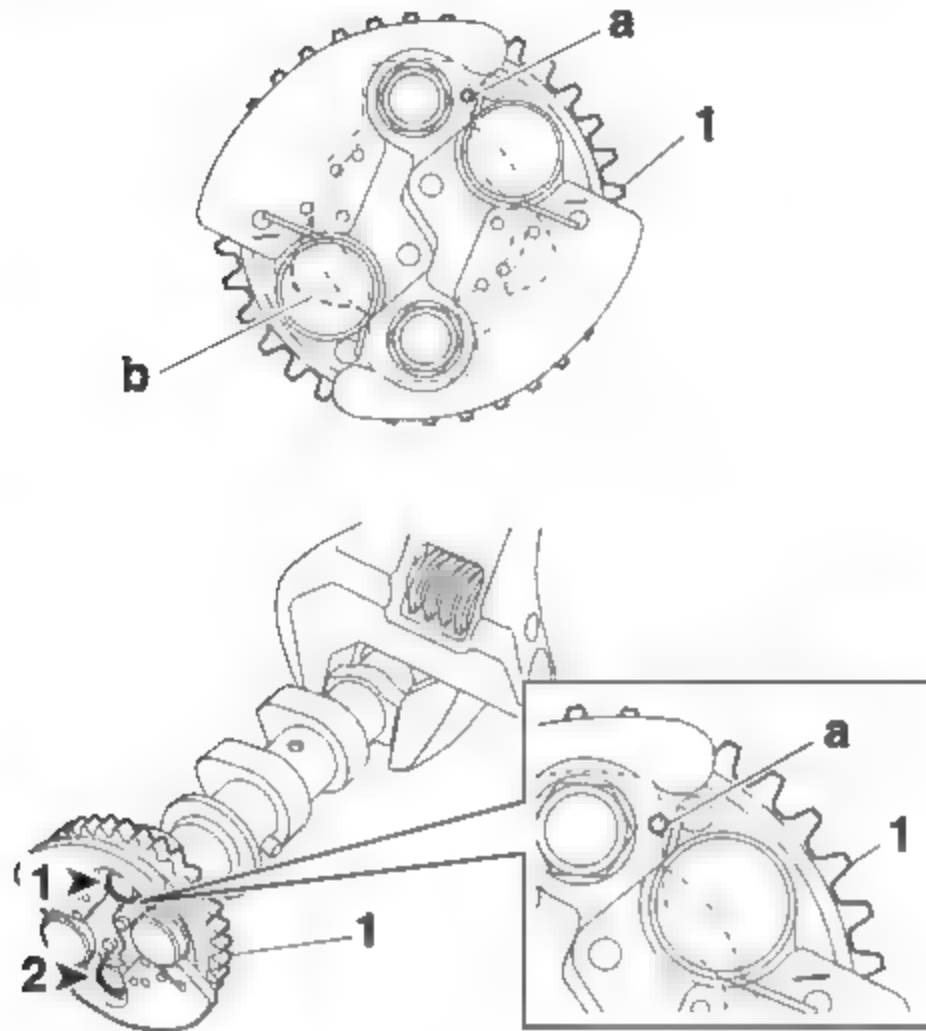
ECA19980

NOTICE

Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.

TIP

- Make sure that the mark "a" on the exhaust camshaft sprocket is aligned with cam lobe #1 "b" as shown in the illustration.
- While holding the exhaust camshaft with a suitable tool, tighten the exhaust camshaft sprocket bolts.
- Tighten the camshaft sprocket bolts in the tightening sequence as shown.



5. Install:

- Timing chain "1"
- (onto the exhaust camshaft sprocket "2")
- Exhaust camshaft
- Exhaust camshaft cap

ECA20930

NOTICE

- Lubricate the camshaft cap bolts with the engine oil.
- The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.
- Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

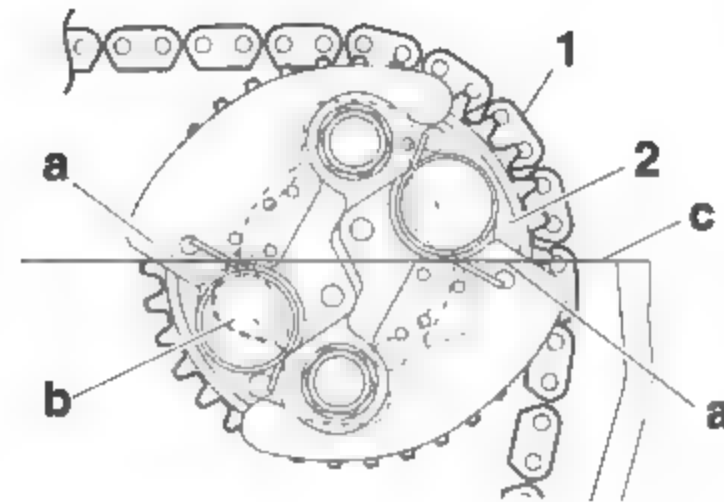
TIP

- When installing the timing chain, start with the exhaust camshaft and be sure to keep the timing chain as tight as possible on the exhaust side.

- Make sure that the match marks "a" on the exhaust camshaft sprocket and cam lobe #1 "b" are aligned with the cylinder head edge "c" as shown in the illustration.
- Temporarily tighten the exhaust camshaft cap bolts, and then tighten the bolts to specification in a crisscross pattern.



Exhaust camshaft cap bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)



6. Install:

- Timing chain "1"
- (onto the intake camshaft sprocket "2")
- Intake camshaft
- Intake camshaft cap

ECA20930

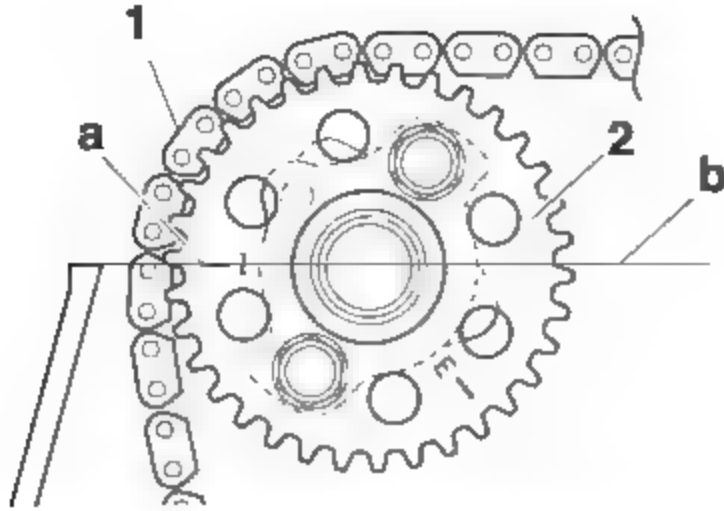
NOTICE

- Lubricate the camshaft cap bolts with the engine oil.
- The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.
- Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

- Install the timing chain onto intake camshaft sprocket, and then install the intake camshaft onto the cylinder head.

TIP

Make sure the match mark "a" on the intake camshaft sprocket is aligned with the cylinder head edge "b".



b. Tighten the intake camshaft cap bolts.

TIP

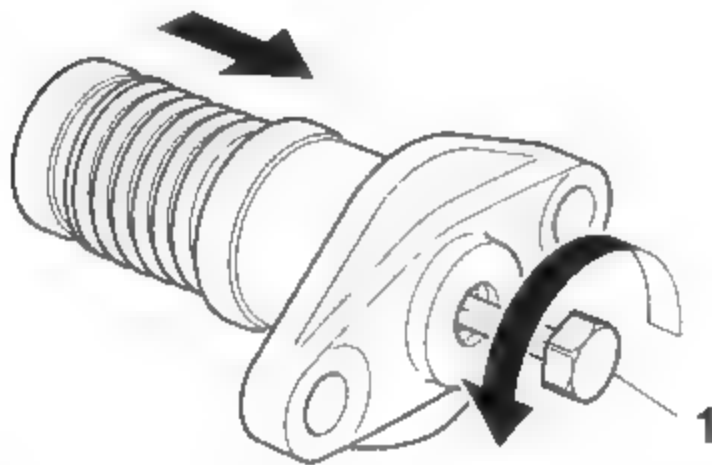
Temporarily tighten the intake camshaft cap bolts, and then tighten the bolts to specification in a crisscross pattern.



Intake camshaft cap bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)

7. Install:

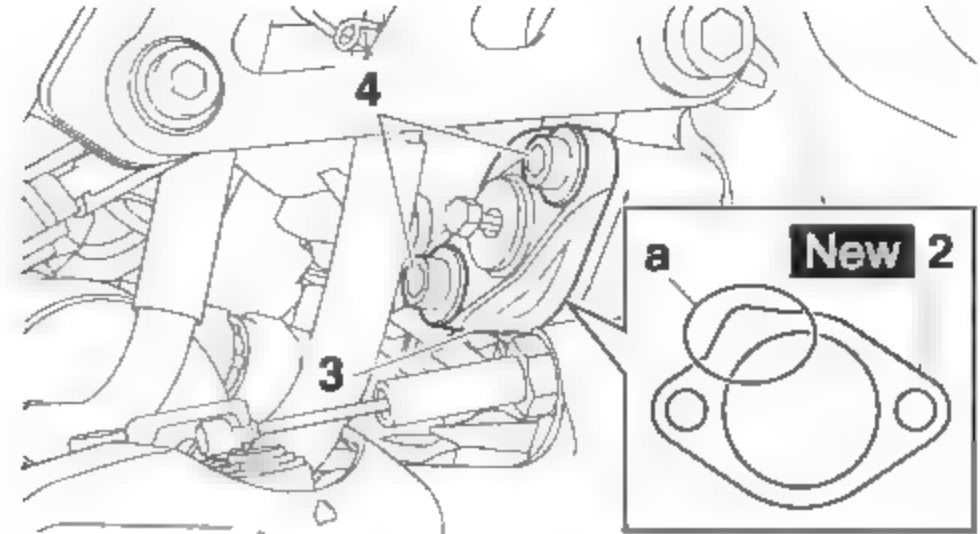
- Timing chain tensioner
- Timing chain tensioner gasket **New**
 - a. While lightly pressing the timing chain tensioner rod by hand, turn the timing chain tensioner rod fully counterclockwise with a hexagon wrench "1" (Parts No.: 1WS-12228-00).



b. Install a new timing chain tensioner gasket "2", the timing chain tensioner "3", and the timing chain tensioner bolts "4" on the cylinder block.

TIP

Be sure to install the timing chain tensioner gasket so that the portion "a" of the gasket is protruding from the upper inner side of the timing chain tensioner.



c. Tighten the timing chain tensioner bolts to specification.

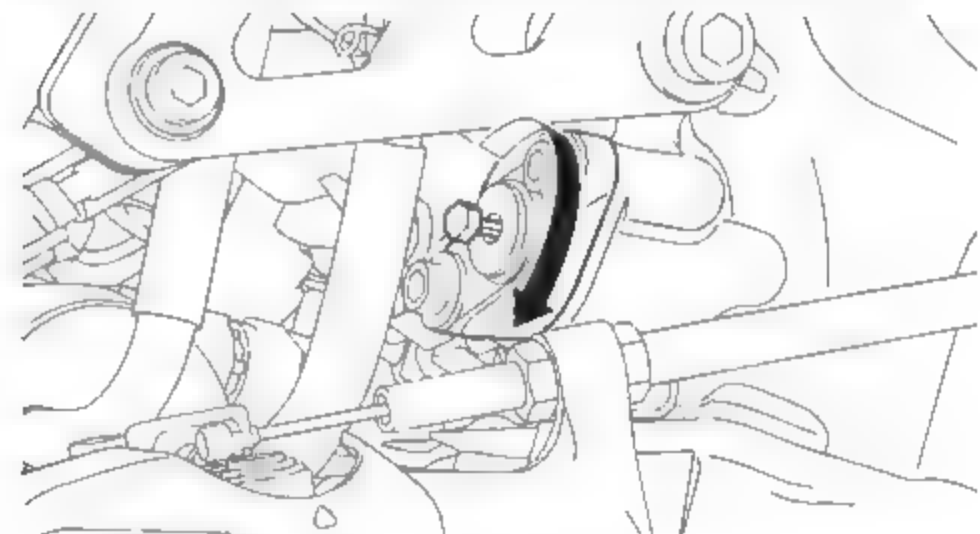


Timing chain tensioner bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)

d. Screw the hexagon wrench by hand until the timing chain tensioner rod touches the timing chain guide, and then tighten 1/4 turn by tool.

TIP

The timing chain tensioner rod is extended by turning the hexagon wrench clockwise.



e. Remove the hexagon wrench.
f. Install the timing chain tensioner cap bolt and gasket, and then tighten the timing chain tensioner cap bolt to specification.



Timing chain tensioner cap bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)

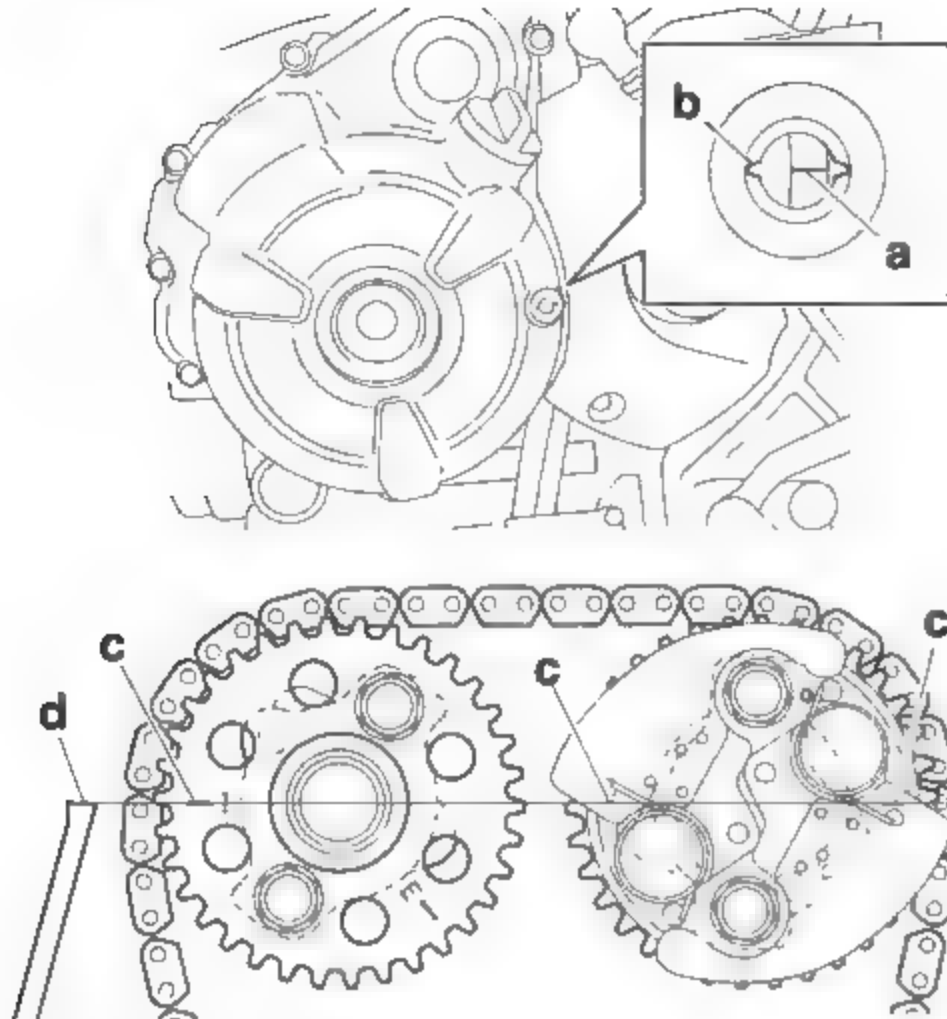
8. Turn:

- Crankshaft
(several turns counterclockwise)

9. Check:

- Mark "a"
Make sure the mark "a" on the generator rotor is aligned with the slot "b" in the generator rotor cover.
- Camshaft sprocket match mark
Make sure the match marks "c" on the camshaft sprockets are aligned with the cylinder head mating surface "d".

Out of alignment → Adjust.
Refer to the installation steps above.



10. Measure:

- Valve clearance
Out of specification → Adjust.
Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-7.

11. Install:

- Crankshaft end cover "1"

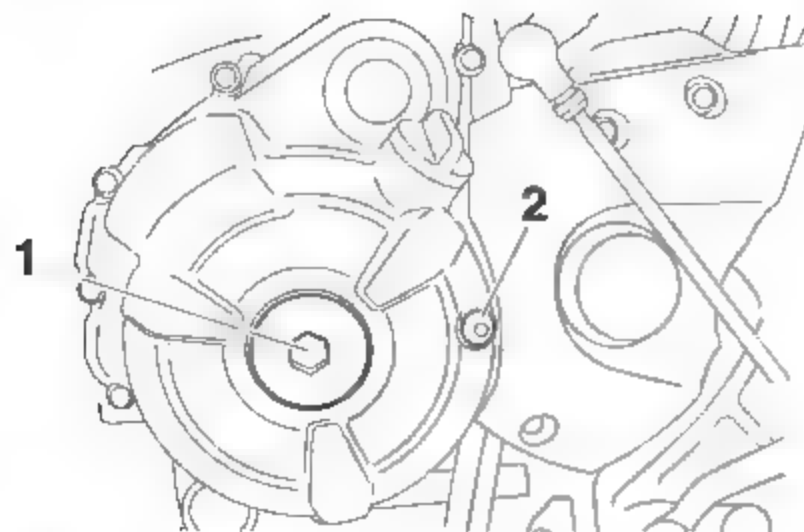


Crankshaft end cover
10 N·m (1.0 kgf·m, 7.4 lb·ft)

- Timing mark accessing bolt "2"



Timing mark accessing bolt
15 N·m (1.5 kgf·m, 11 lb·ft)



EAS30274

INSTALLING THE CYLINDER HEAD COVER

1. Install:

- Timing chain guide (top side)
- Cylinder head cover gasket "1" **New**
(to the cylinder head cover)
- Cylinder head cover "2"



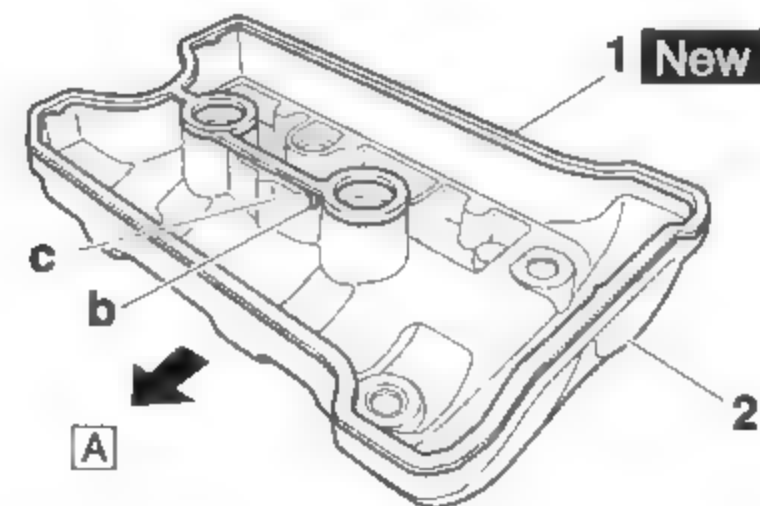
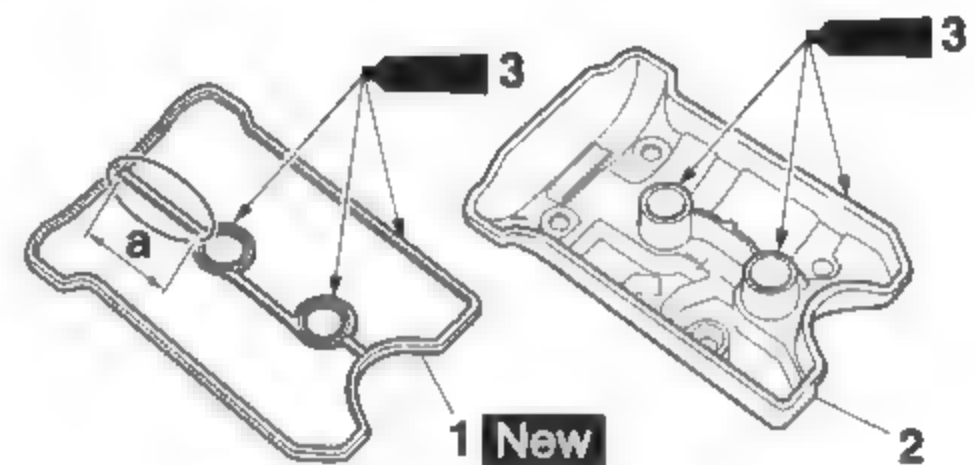
Cylinder head cover bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)

TIP

- Apply Three bond No. 1215® "3" onto the mating surfaces of the cylinder head cover gasket and cylinder head.
- After installing the cylinder head cover gasket "1" to the cylinder head cover, cut off the "a" section.
- Make sure that the projection "b" on the cylinder head cover gasket is positioned on the exhaust side of the rib "c" on the cylinder head cover.



Yamaha bond No. 1215
90890-85505
Three bond No. 1215®



A. Exhaust side

2. Install:

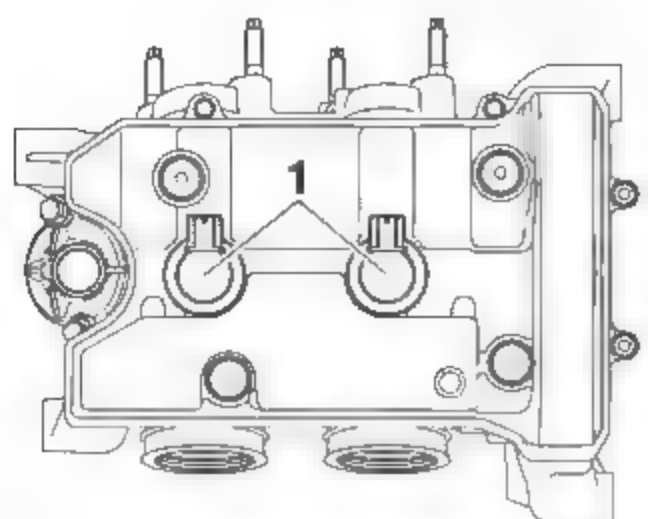
- Spark plugs
- Ignition coils "1"



Spark plug
13 N·m (1.3 kgf·m, 9.6 lb·ft)

TIP

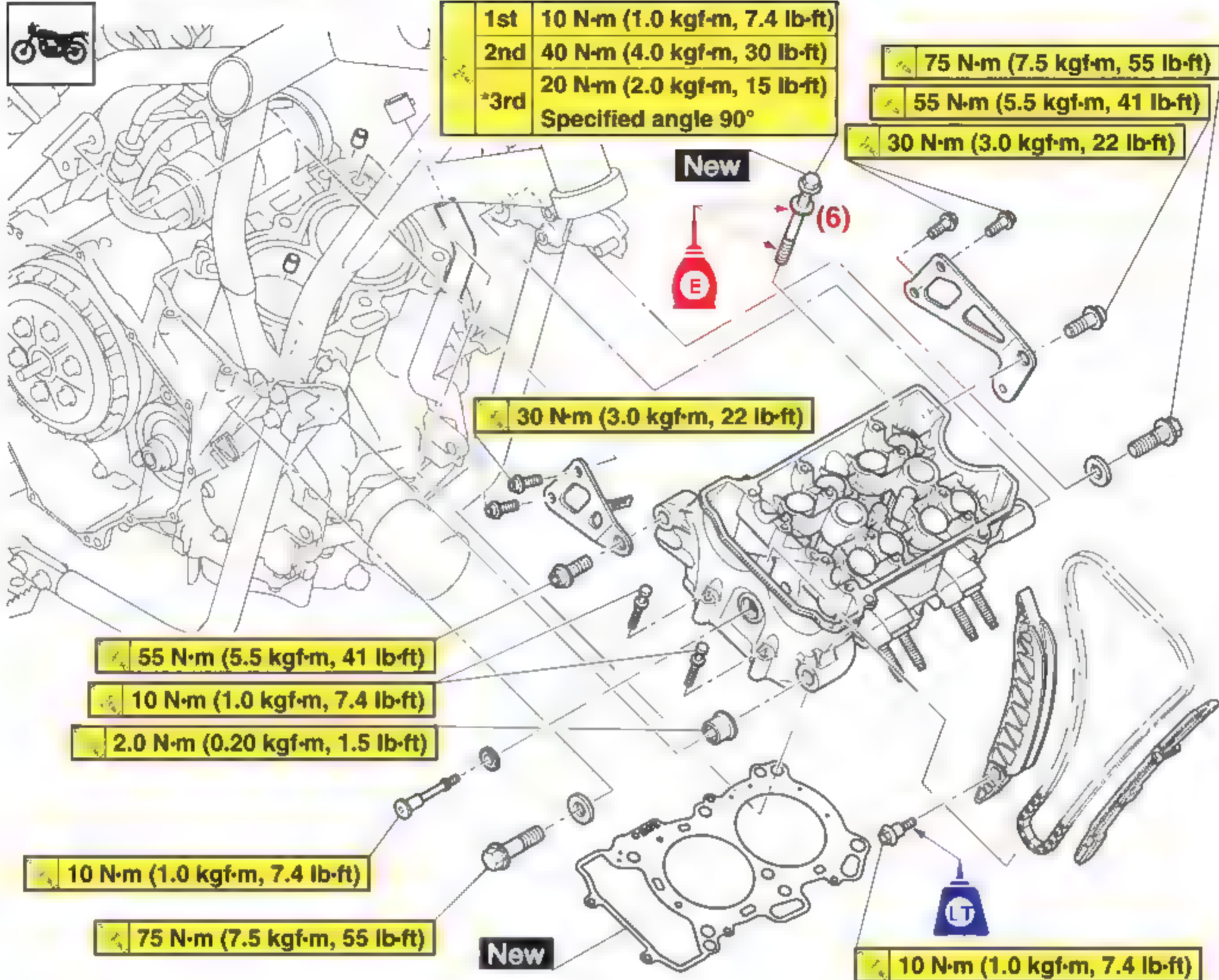
Install the ignition coils "1" in the direction shown in the illustration.



EAS20044

CYLINDER HEAD

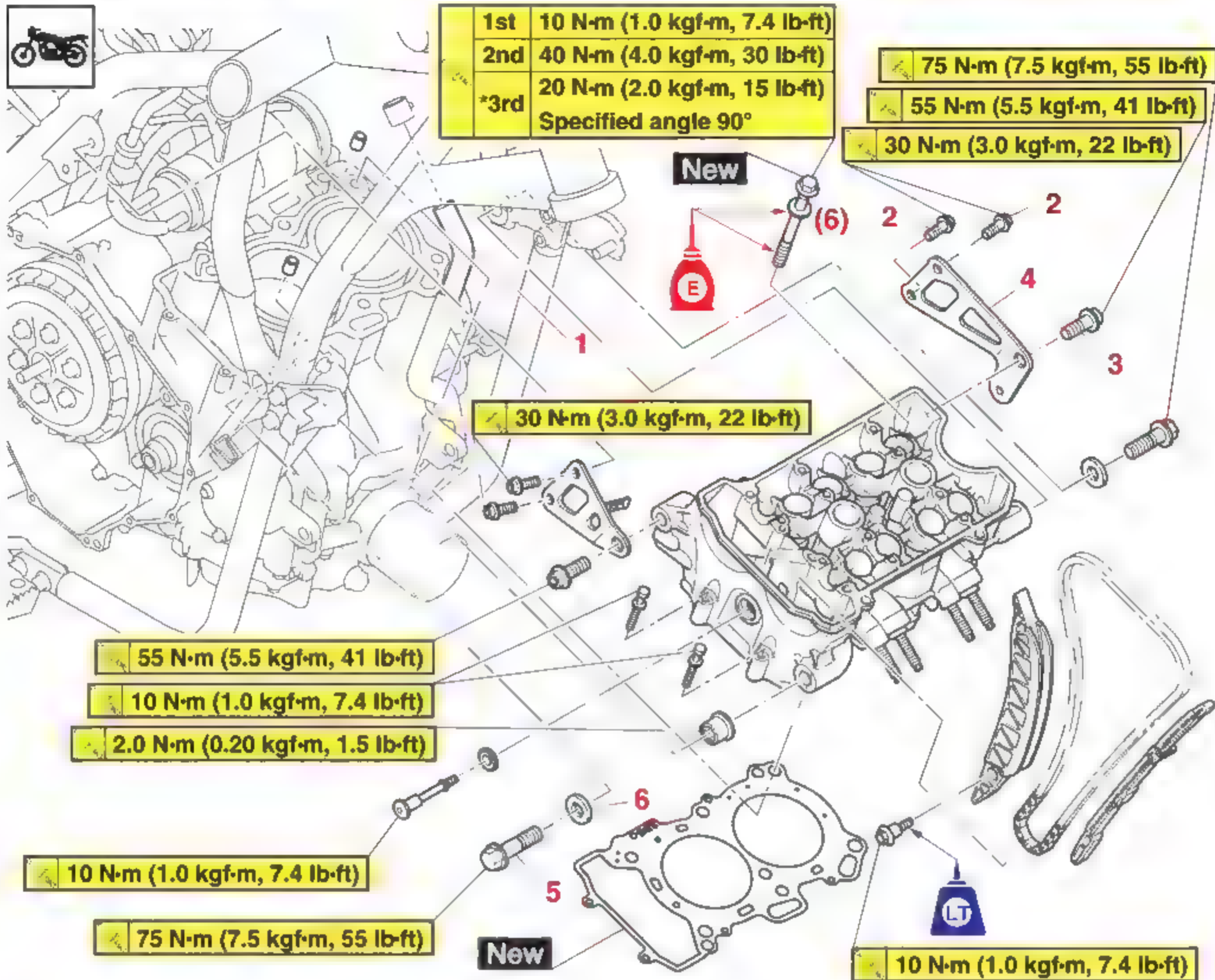
Removing the cylinder head



* Following the tightening order, loosen the bolt one by one, and then retighten it to specific torque.

Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-28.
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Side covers		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Air scoops/Air ducts/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-6.
	Radiator		Refer to "RADIATOR" on page 6-2.

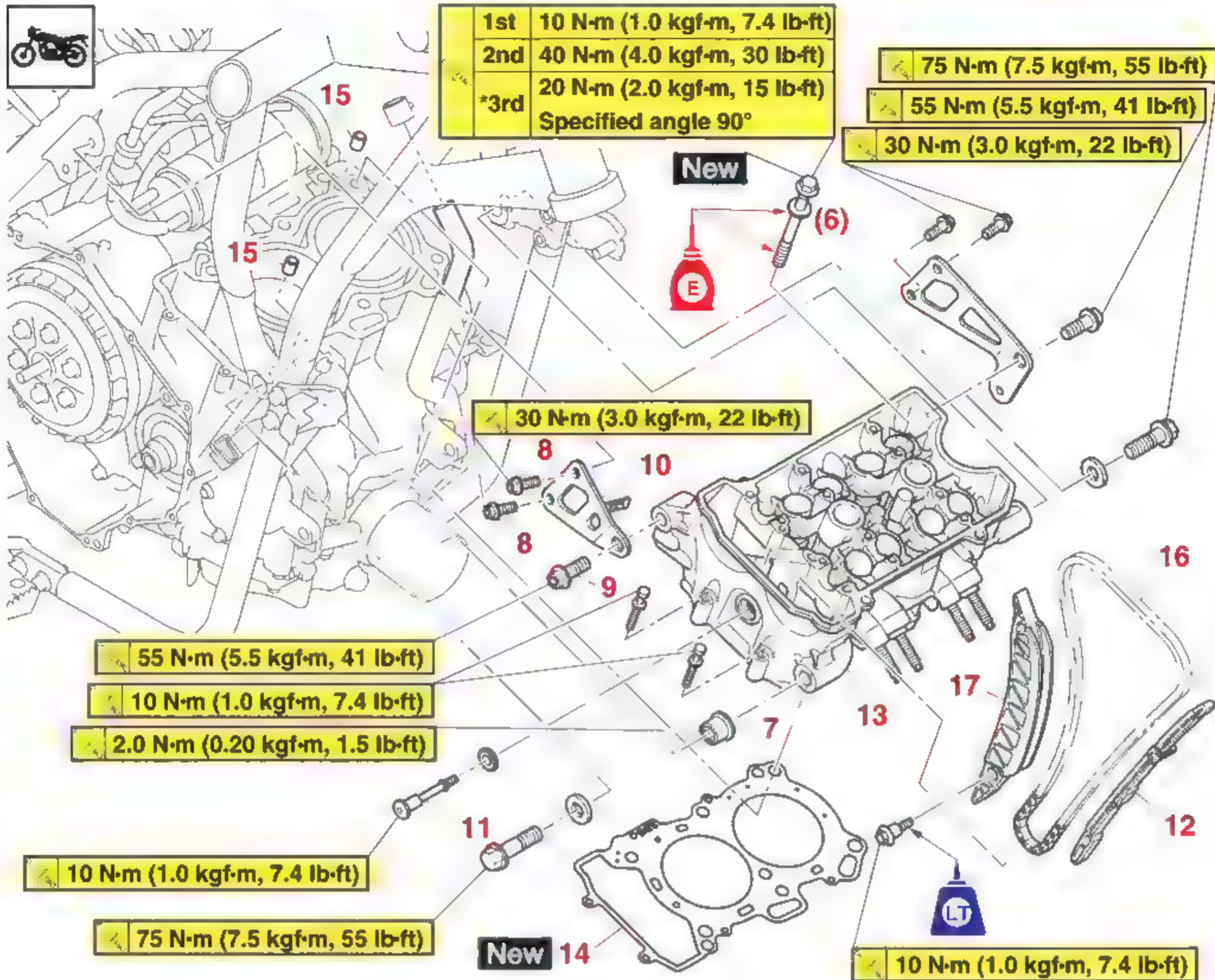
Removing the cylinder head



* Following the tightening order, loosen the bolt one by one, and then retighten it to specific torque.

Order	Job/Parts to remove	Q'ty	Remarks
	Thermostat		Refer to "OIL COOLER" on page 6-5.
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-10.
	Intake camshaft/Exhaust camshaft		Refer to "CAMSHAFTS" on page 5-20.
	Water pump housing		Refer to "WATER PUMP" on page 6-9.
	Clutch cover		Refer to "CLUTCH" on page 5-52.
1	Oil cooler inlet hose	1	Disconnect.
2	Engine bracket bolt (left)	2	
3	Engine mounting bolt (left upper side)	1	
4	Engine bracket (left)	1	
5	Engine mounting bolt (front right side)	1	
6	Collar	1	

Removing the cylinder head



* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

Order	Job/Parts to remove	Q'ty	Remarks
7	Engine mounting adjust bolt	1	Loosen. TIP Turn the bolt counterclockwise using a 1/2 inch hexagon bit socket.
8	Engine bracket bolt (right)	2	
9	Engine mounting bolt (right upper side)	1	
10	Engine bracket (right)	1	
11	Timing chain bolt (right side of cylinder head)	1	
12	Timing chain guide (exhaust side)	1	
13	Cylinder head	1	
14	Cylinder head gasket	1	
15	Dowel pin	2	
16	Timing chain	1	
17	Timing chain guide (intake side)	1	

EAS30276

REMOVING THE CYLINDER HEAD

1. Remove:

- Engine bracket bolts (left)
- Engine mounting bolt (left upper side)
- Engine bracket (left)
- Engine mounting bolt (front right side)
- Collar

TIP

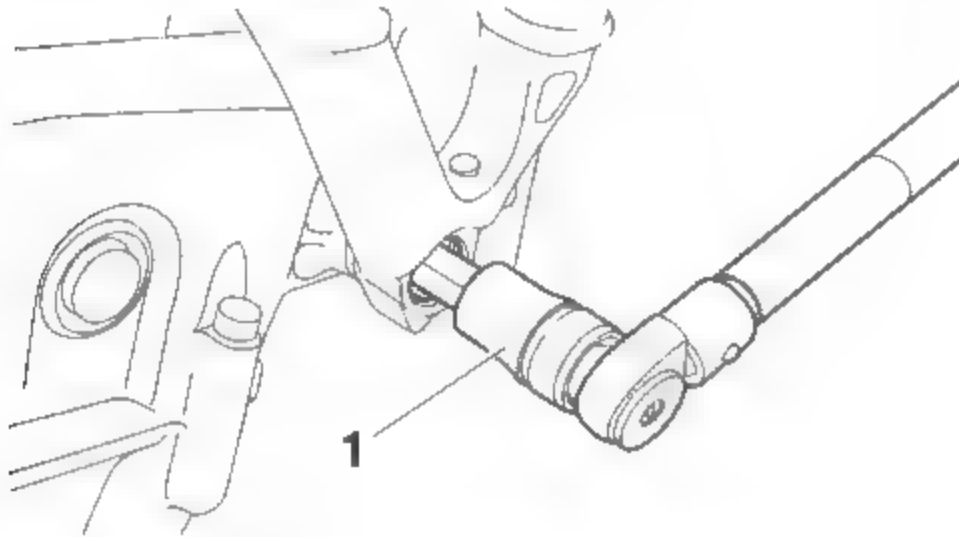
Place a suitable stand under the engine.

2. Loosen:

- Engine mounting adjust bolt

TIP

Loosen the engine mounting adjust bolt using a 1/2 inch hexagon bit socket "1".



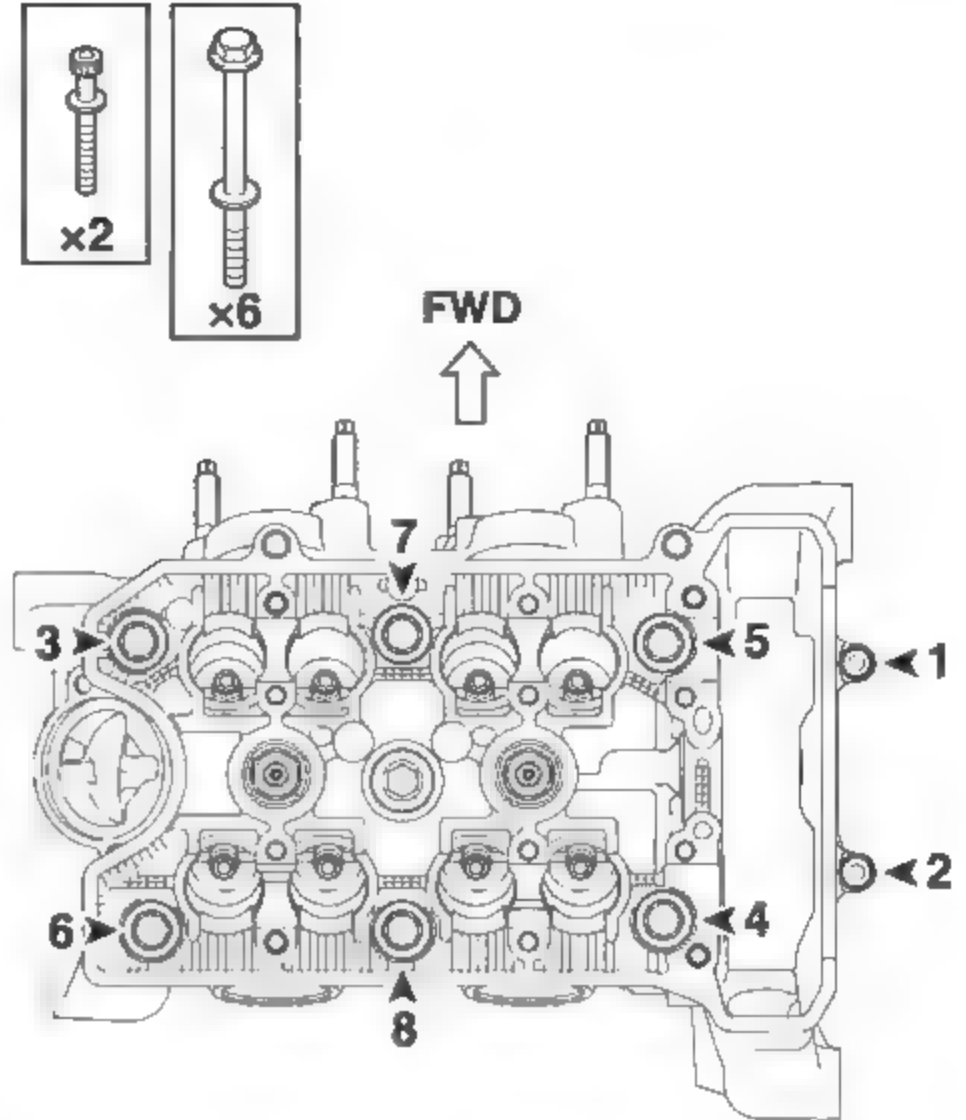
3. Remove:

- Cylinder head bolt (M6) (x2)
- Cylinder head bolt (M10) (x6)

TIP

- Loosen the bolts in the proper sequence as shown.
- Loosen each bolt 1/2 of a turn at a time. After all of the bolts are fully loosened, remove them.

- M6 x 45 mm: "1", "2"
- M10 x 100 mm: "3"–"8"



EAS30278

CHECKING THE TIMING CHAIN GUIDES

1. Check:

- Timing chain guide (exhaust side)
 - Timing chain guide (intake side)
- Damage/wear → Replace.

EAS30277

CHECKING THE CYLINDER HEAD

1. Eliminate:

- Combustion chamber carbon deposits (with a rounded scraper)

TIP

Do not use a sharp instrument to avoid damaging or scratching:

- Spark plug bore threads
- Valve seats

2. Check:

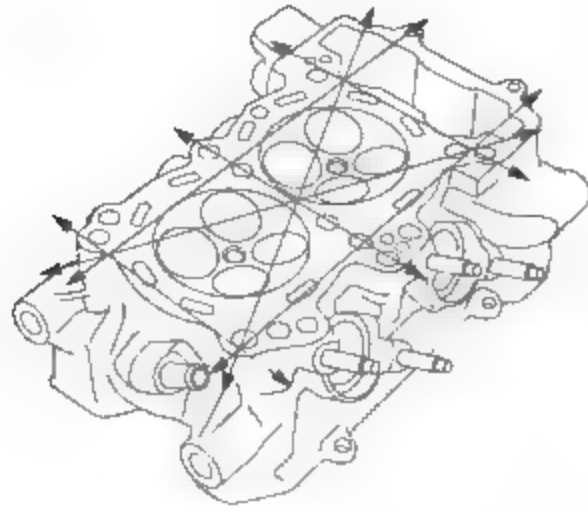
- Cylinder head
Damage/scratches → Replace.
- Cylinder head water jacket
Mineral deposits/rust → Eliminate.

3. Measure:

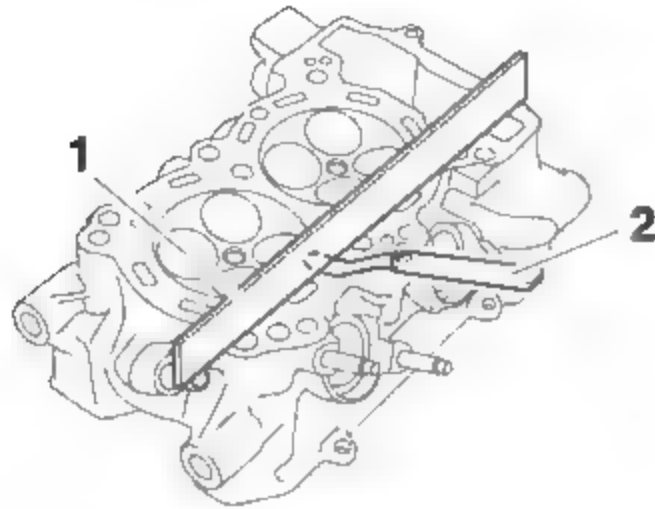
- Cylinder head warpage
Out of specification → Resurface the cylinder head.



Warpage limit
0.10 mm (0.0039 in)



- a. Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



- b. Measure the warpage.
c. If the limit is exceeded, resurface the cylinder head as follows.
d. Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

TIP

To ensure an even surface, rotate the cylinder head several times.

EAG30262

INSTALLING THE CYLINDER HEAD

1. Install:

- Cylinder head
- Cylinder head bolt (M10) (x6) **New**
- Cylinder head bolt (M6) (x2)

TIP

- Pass the timing chain through the timing chain cavity.
- Lubricate the cylinder head bolt (M10) threads and mating surface with engine oil.

2. Tighten:

- Cylinder head bolts "1"–"6"
- Cylinder head bolts "7", "8"



Cylinder head bolt ("1"–"6")

1st: 10 N·m (1.0 kgf·m, 7.4 lb·ft)

2nd: 40 N·m (4.0 kgf·m, 30 lb·ft)

*3rd: 20 N·m (2.0 kgf·m, 15 lb·ft)

Specified angle 90°

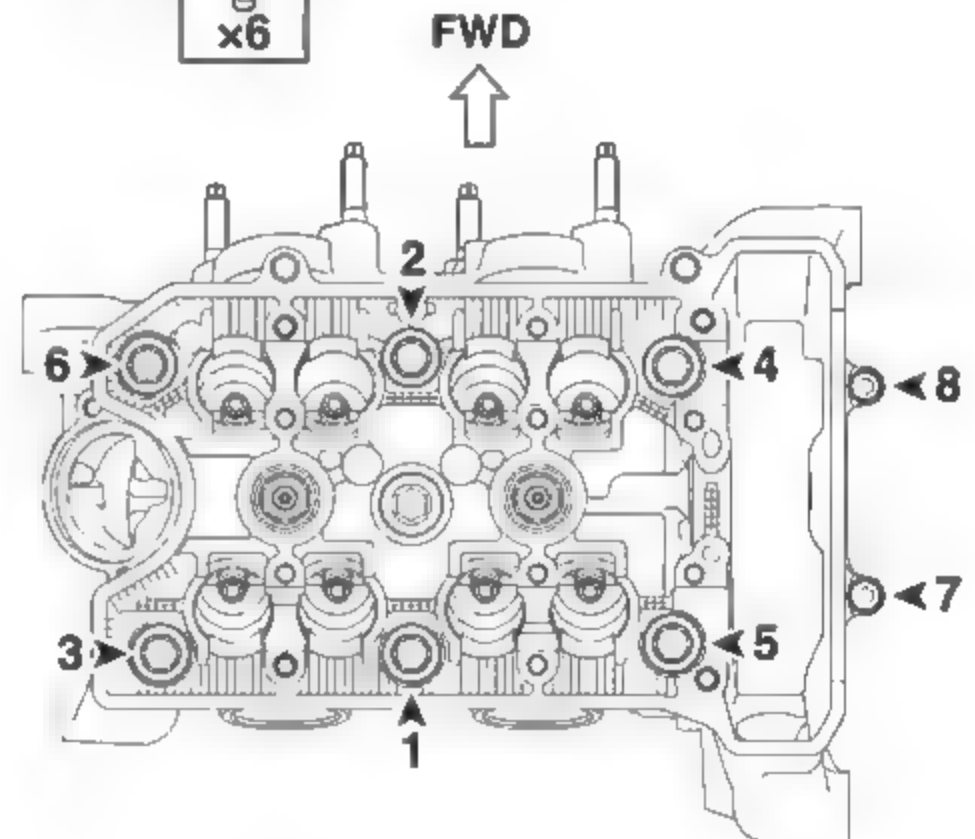
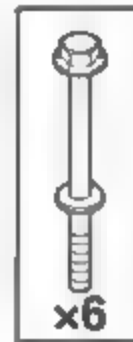
Cylinder head bolt ("7", "8")

10 N·m (1.0 kgf·m, 7.4 lb·ft)

* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque and angle.

TIP

Tighten the cylinder head bolts in the tightening sequence as shown and torque them in 3 stages.



3. Tighten:

- Engine mounting adjust bolt

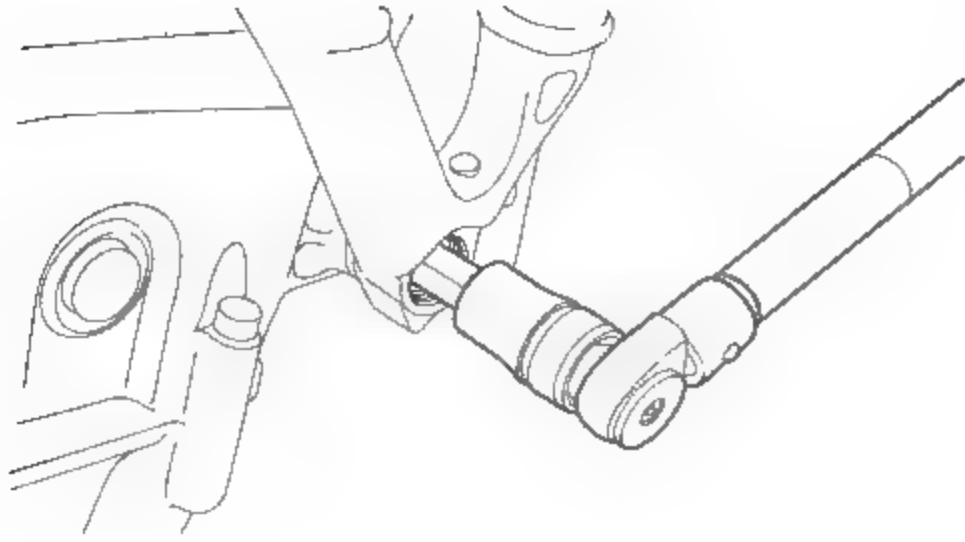
TIP

- Tighten the engine mounting adjust bolt to specification with a 1/2 inch hexagon bit socket.
- Make sure that the flange of the engine mounting adjust bolt contacts the engine.



Engine mounting adjust bolt

2.0 N·m (0.20 kgf·m, 1.5 lb·ft)

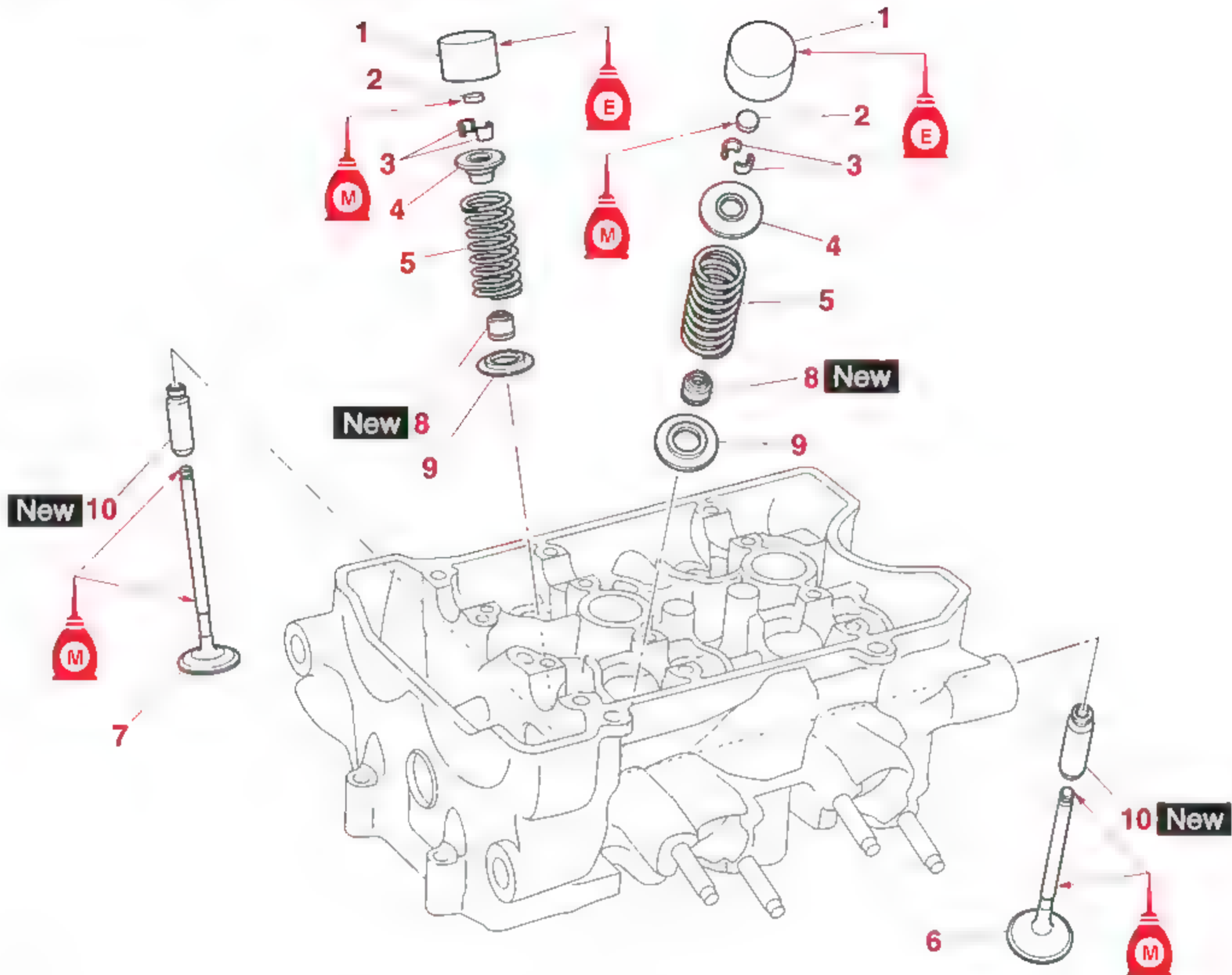


VALVES AND VALVE SPRINGS

EAS20045

VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-31.
1	Valve lifter	8	
2	Valve pad	8	
3	Valve cotter	16	
4	Valve spring retainer	8	
5	Valve spring	8	
6	Exhaust valve	4	
7	Intake valve	4	
8	Valve stem seal	8	
9	Valve spring seat	8	
10	Valve guide	8	

VALVES AND VALVE SPRINGS

EAS30283

REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

TIP

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Remove:

- Valve lifter
- Valve pad

TIP

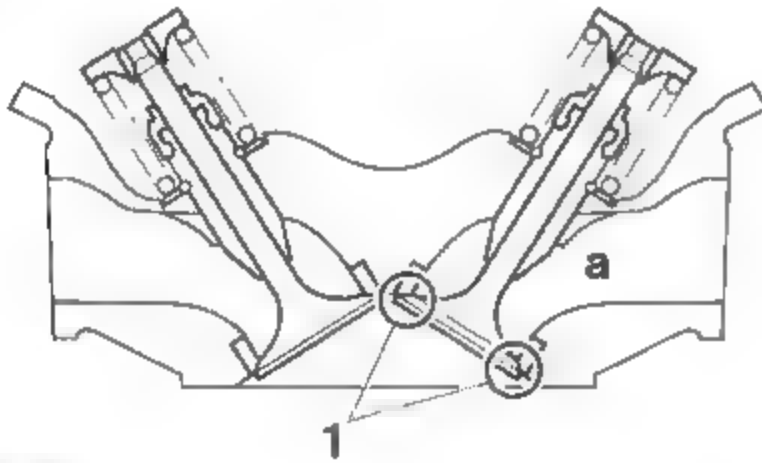
Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.

2. Check:

- Valve sealing
Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.
Refer to "CHECKING THE VALVE SEATS" on page 5-40.
 - a. Pour a clean solvent "a" into the intake and exhaust ports.
 - b. Check that the valves properly seal.

TIP

There should be no leakage at the valve seat "1".



G088958

3. Remove:

- Valve cotters

TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".



Valve spring compressor
90890-04200

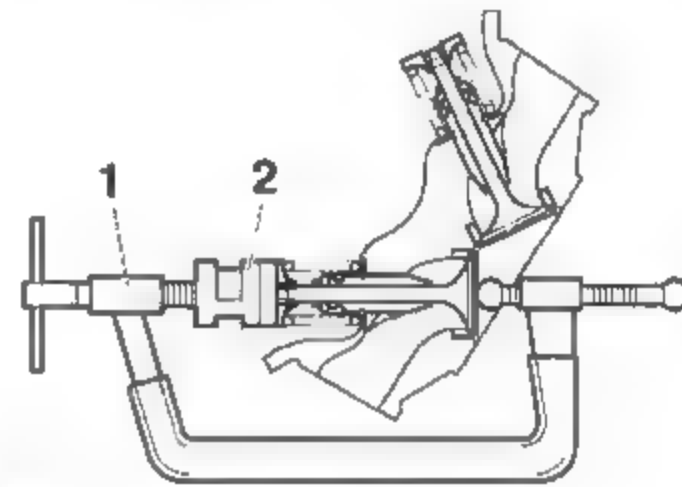
Valve spring compressor
YM-04019

Valve spring compressor attachment (ø26)

90890-01243

Valve spring compressor attachment (ø26)

YM-01253-1



G088959

4. Remove:

- Valve spring retainer
- Valve spring
- Valve
- Valve stem seal
- Valve spring seat

TIP

Identify the position of each part very carefully so that it can be reinstalled in its original place.

EAS30284

CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

1. Measure:

- Valve-stem-to-valve-guide clearance
Out of specification → Replace the valve guide.

- Valve-stem-to-valve-guide clearance =
Valve guide inside diameter "a" -
Valve stem diameter "b"

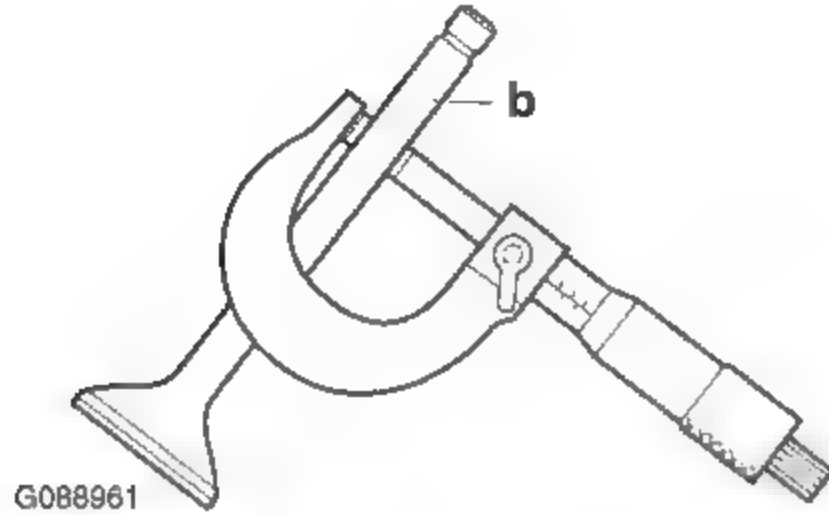
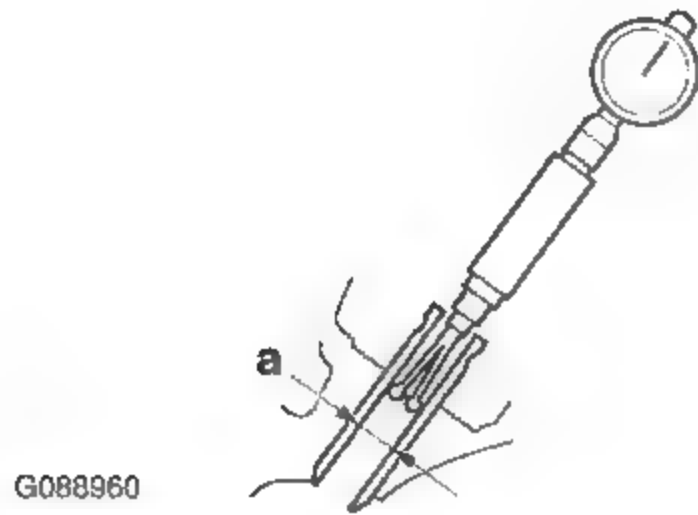


Valve-stem-to-valve-guide clearance limit (intake)

0.080 mm (0.0032 in)

Valve-stem-to-valve-guide clearance limit (exhaust)

0.100 mm (0.0039 in)

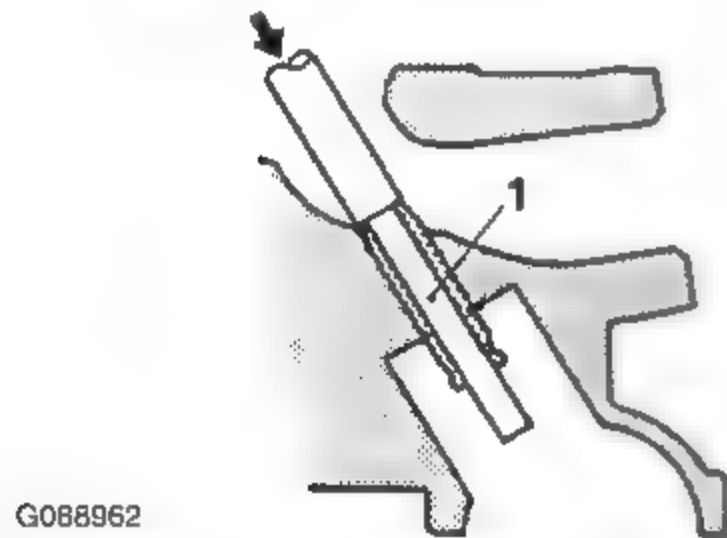


2. Replace:
- Valve guide

TIP

To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

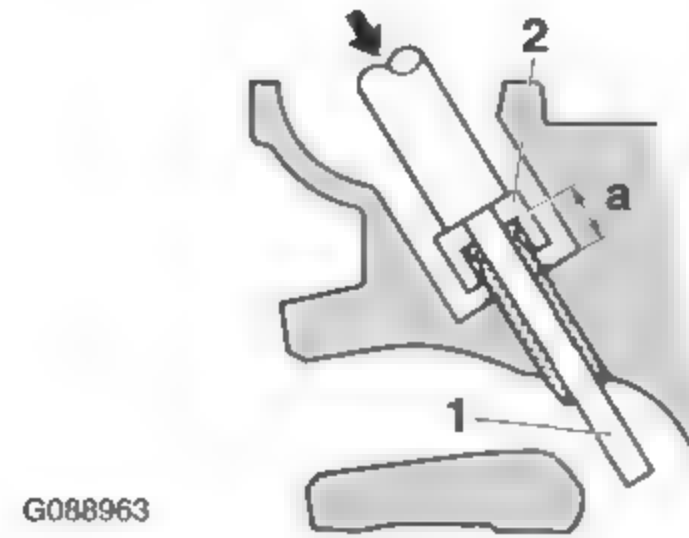
- a. Remove the valve guide with the valve guide remover "1".



- b. Install the new valve guide with the valve guide installer "2" and valve guide remover "1".

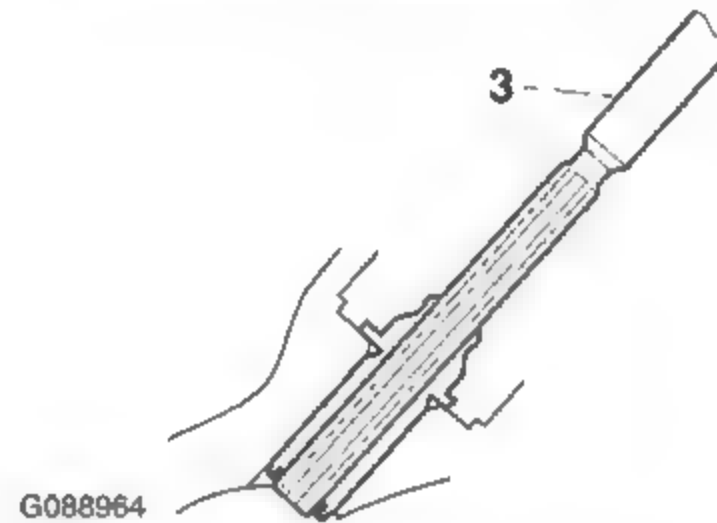


Valve guide position
14.8–15.2 mm (0.58–0.60 in)



- a. Valve guide position

- c. After installing the valve guide, bore the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.



TIP

After replacing the valve guide, reface the valve seat.



Valve guide remover (ø4.5)
90890-04116
Valve guide remover (4.5 mm)
YM-04116
Valve guide installer (ø4.5)
90890-04117
Valve guide installer (4.5 mm)
YM-04117
Valve guide reamer (ø4.5)
90890-04118
Valve guide reamer (4.5 mm)
YM-04118

3. Eliminate:

- Carbon deposits
(from the valve face and valve seat)

4. Check:

- Valve face
Pitting/wear → Grind the valve face.
- Valve stem end
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.

VALVES AND VALVE SPRINGS

5. Measure:

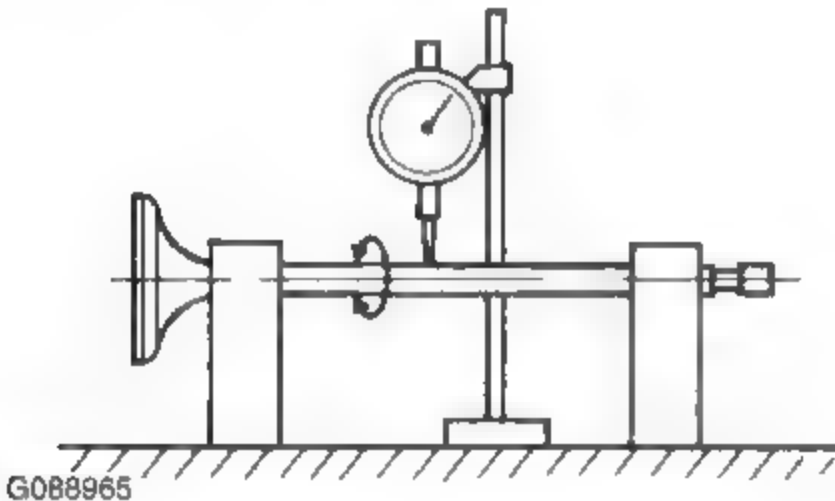
- Valve stem runout
Out of specification → Replace the valve.

TIP

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.



Valve stem runout
0.020 mm (0.0008 in)



EAS30285

CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

1. Eliminate:

- Carbon deposits
(from the valve face and valve seat)

2. Check:

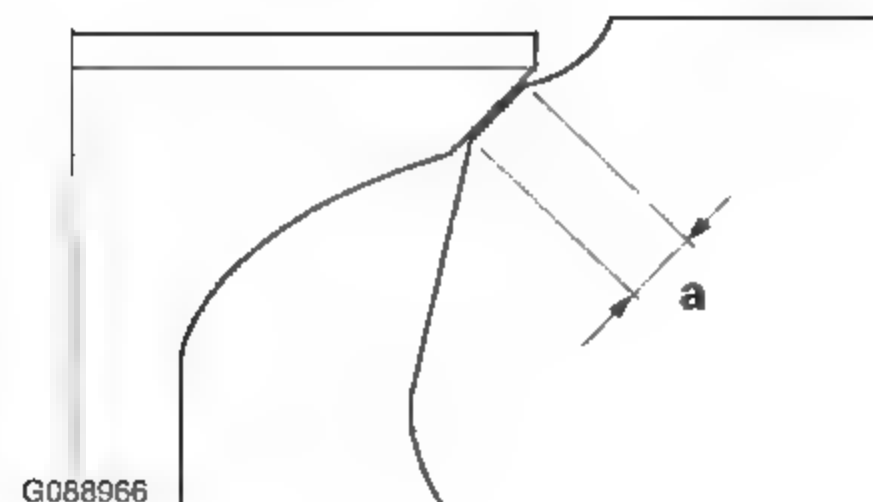
- Valve seat
Pitting/wear → Replace the cylinder head.

3. Measure:

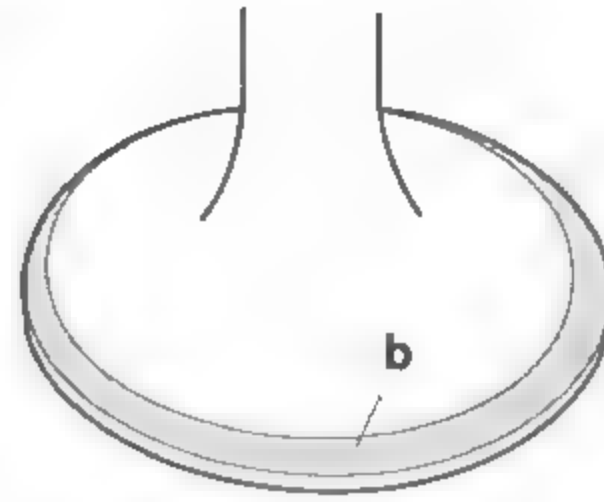
- Valve seat width "a"
Out of specification → Replace the cylinder head.



**Valve seat contact width limit (in-
take)**
1.6 mm (0.06 in)
**Valve seat contact width limit (ex-
haust)**
1.6 mm (0.06 in)



- Apply blue layout fluid "b" onto the valve face.



- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear impression.
- Measure the valve seat width.

TIP

Where the valve seat and valve face contacted one another, the blueing will have been removed.

4. Lap:

- Valve face
- Valve seat

TIP

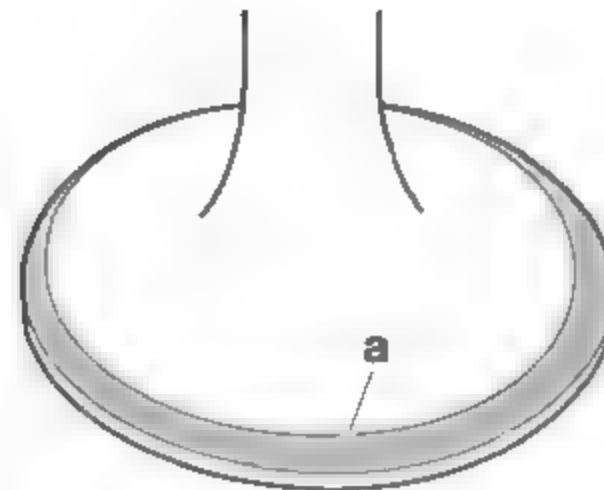
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

- Apply a coarse lapping compound "a" to the valve face.

ECA13730

NOTICE

Do not let the lapping compound enter the gap between the valve stem and the valve guide.

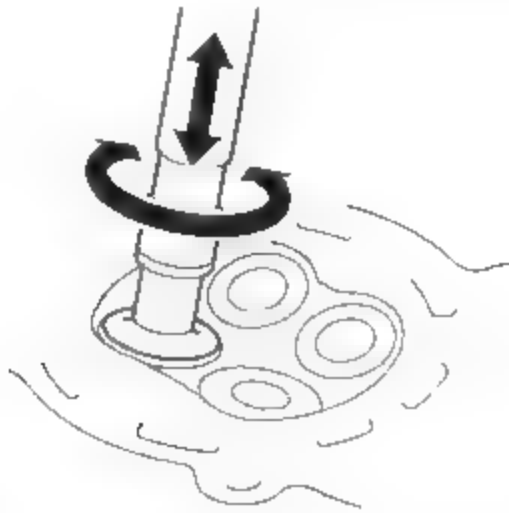


- Apply molybdenum disulfide oil onto the valve stem.
- Install the valve into the cylinder head.
- Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

VALVES AND VALVE SPRINGS

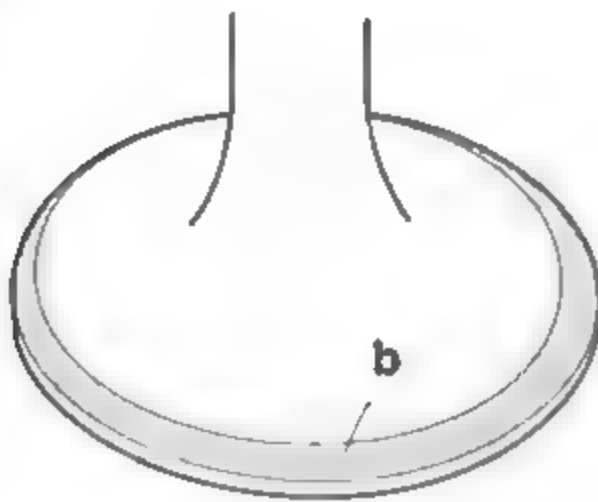
TIP

For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



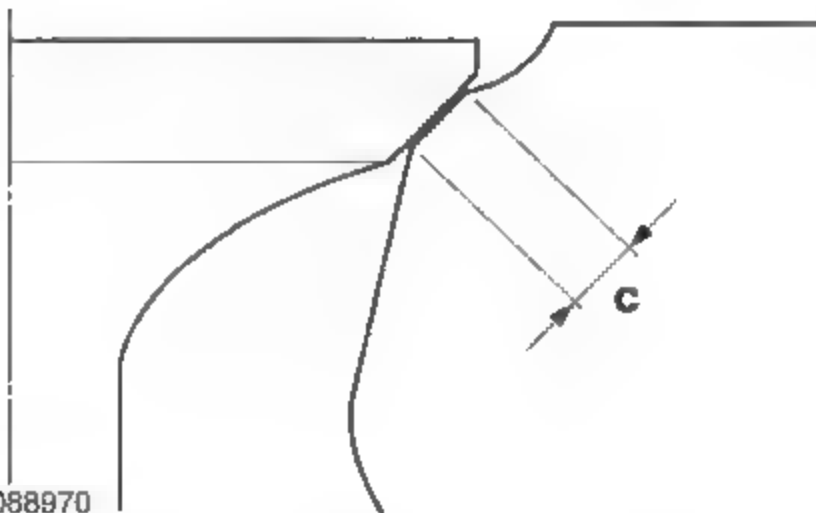
G088969

- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply blue layout fluid "b" onto the valve face.



G088967

- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width "c" again. If the valve seat width is out of specification, reface and lap the valve seat.



G088970

EAS30286

CHECKING THE VALVE SPRINGS

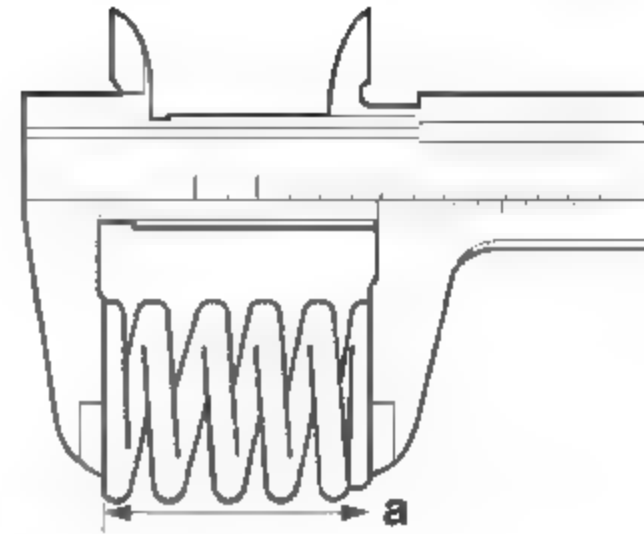
The following procedure applies to all of the valve springs.

1. Measure:

- Valve spring free length "a"
Out of specification → Replace the valve spring.



Free length limit (intake)
38.29 mm (1.51 in)
Free length limit (exhaust)
39.32 mm (1.55 in)



G088971

CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

1. Check:

- Valve lifter
Damage/scratches → Replace the valve lifters and cylinder head.

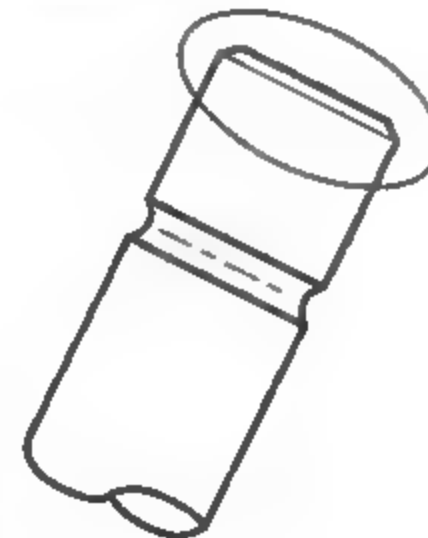
EAS30288

INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

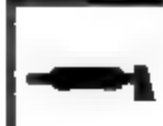
1. Deburr:

- Valve stem end
(with an oil stone)



2. Lubricate:

- Valve stem
- Valve stem end
(with the recommended lubricant)



Recommended lubricant
Molybdenum disulfide oil

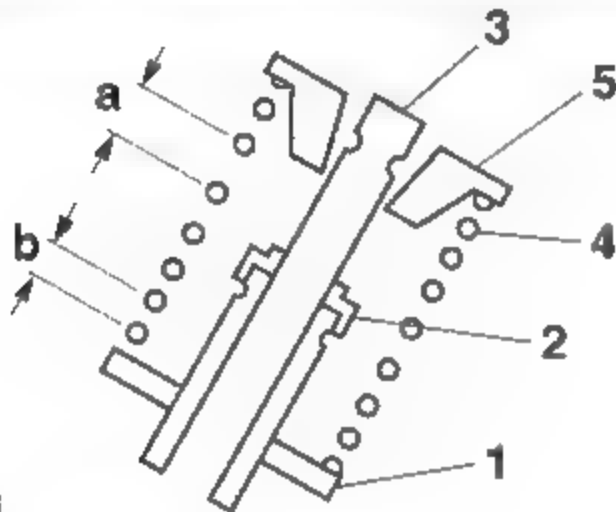
VALVES AND VALVE SPRINGS

3. Install:

- Valve spring seat "1"
(into the cylinder head)
- Valve stem seal "2" **New**
- Valve "3"
- Valve spring "4"
- Valve spring retainer "5"

TIP

- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch "a" facing up.



b. Smaller pitch

4. Install:

- Valve cotters

TIP

Install the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".

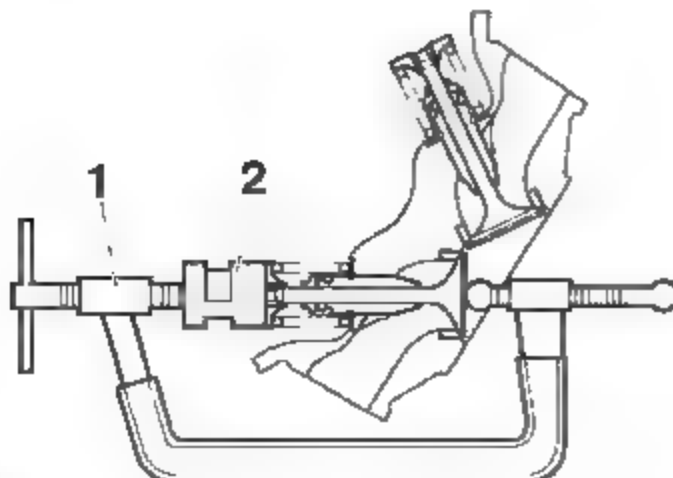


Valve spring compressor
90890-04200

Valve spring compressor
YM-04019

Valve spring compressor attach-
ment (ø26)
90890-01243

Valve spring compressor attach-
ment (ø26)
YM-01253-1

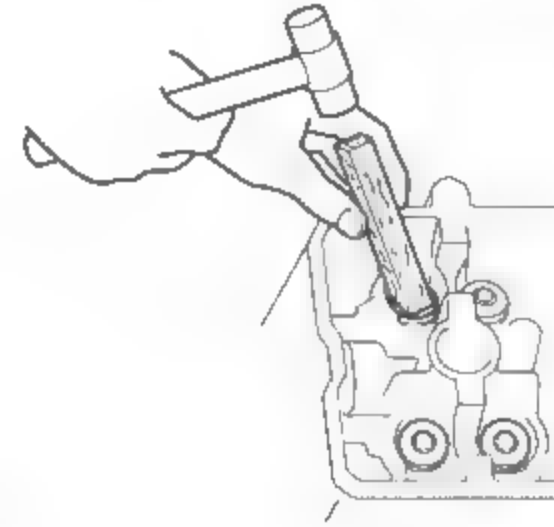


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

NOTICE

Hitting the valve tip with excessive force could damage the valve.



G088975

6. Lubricate:

- Valve lifter
(with the recommended lubricant)



Recommended lubricant
Engine oil

7. Install:

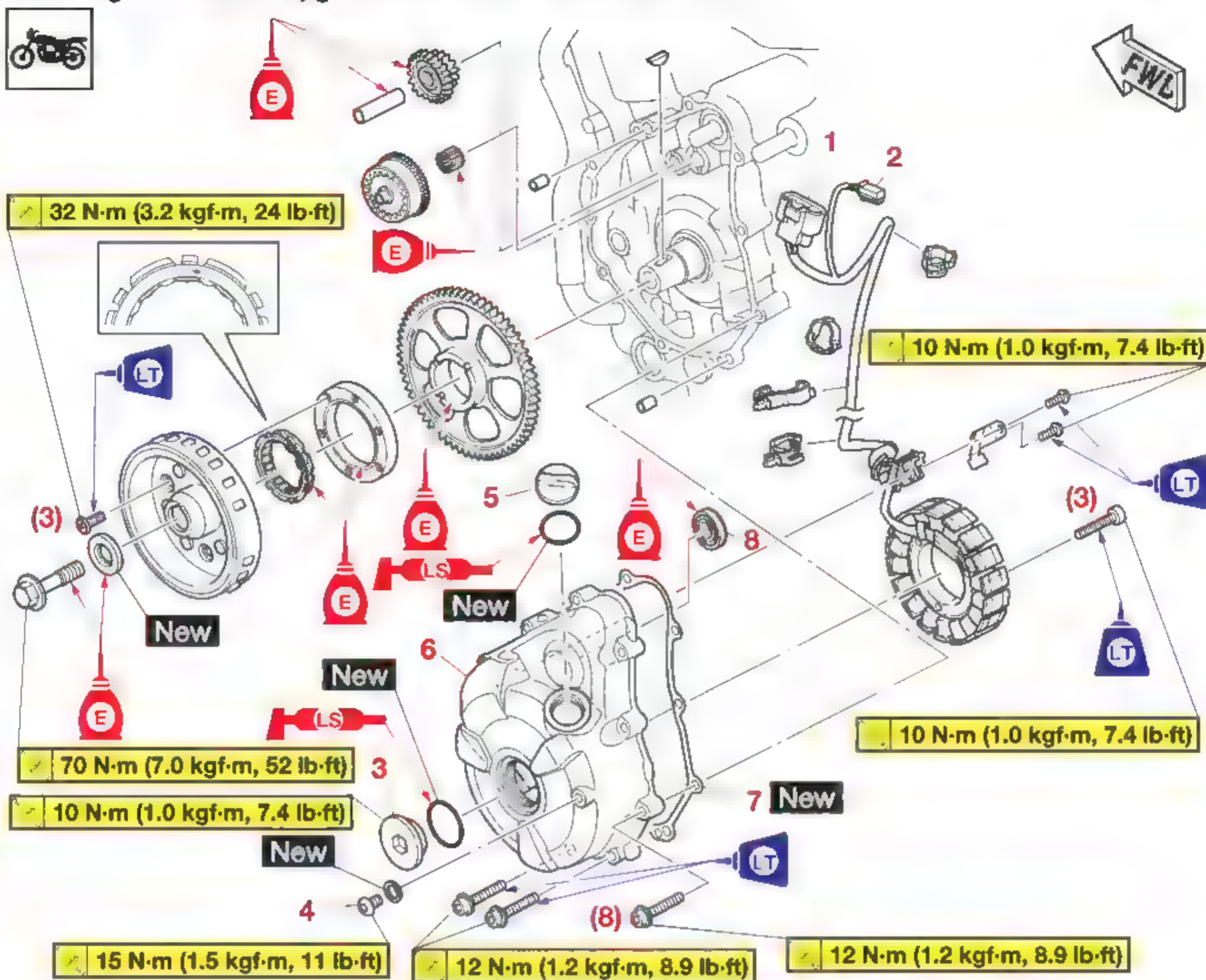
- Valve pad
- Valve lifter

TIP

- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in their original position.

EAS20140

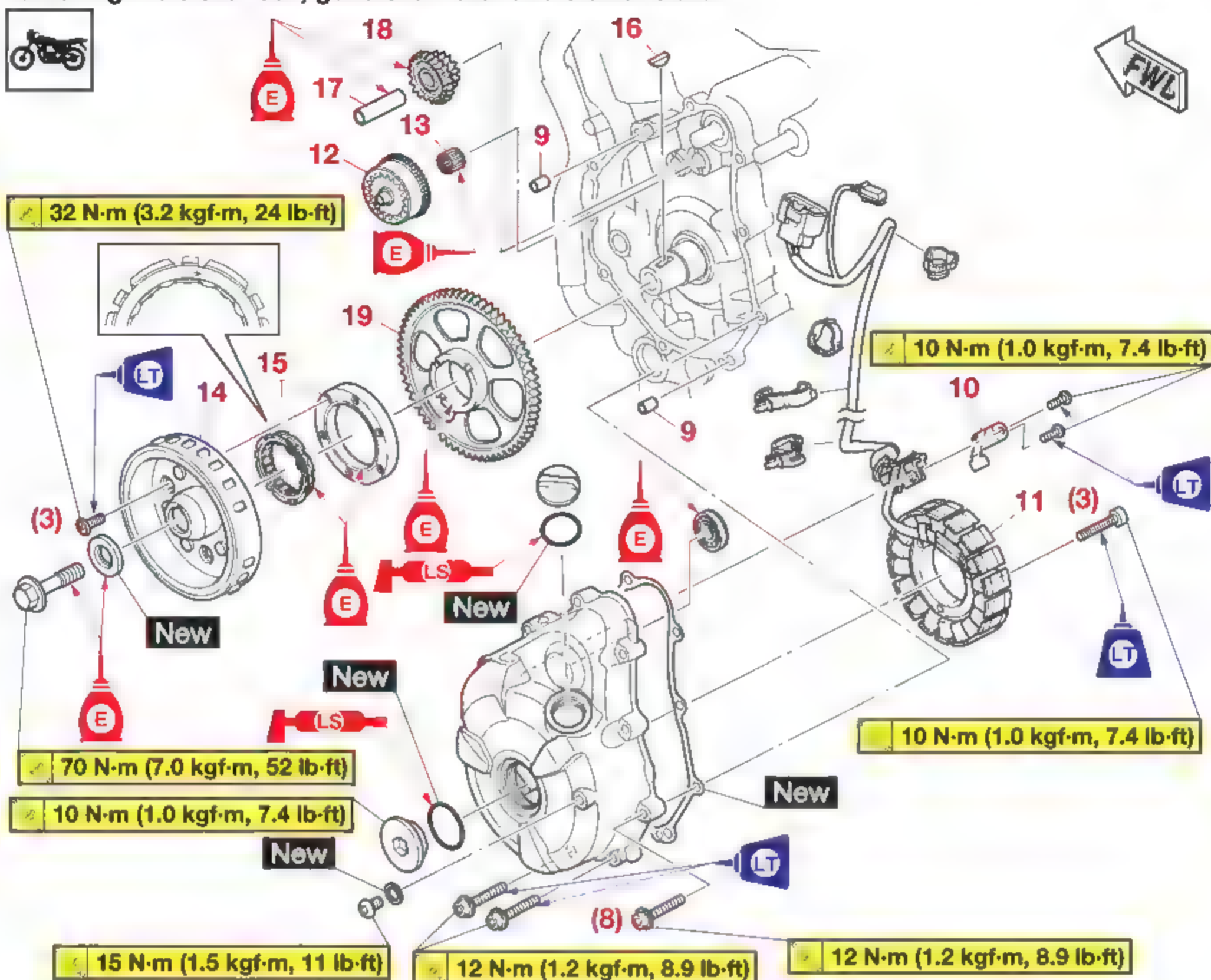
Removing the stator coil, generator rotor and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
	Air scoop (left)/Air duct (left)		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25.
1	Stator coil coupler	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3	Crankshaft end cover	1	
4	Timing mark accessing bolt	1	
5	Oil filler cap	1	
6	Generator cover	1	
7	Generator cover gasket	1	
8	Bearing	1	

GENERATOR AND STARTER CLUTCH

Removing the stator coil, generator rotor and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
9	Dowel pin	2	
10	Stator coil lead holder	1	
11	Stator coil assembly (Stator coil/Crankshaft position sensor)	1	
12	Torque limiter	1	
13	Bearing	1	
14	Generator rotor	1	
15	Starter clutch	1	
16	Woodruff key	1	
17	Starter clutch idle gear shaft	1	
18	Starter clutch idle gear	1	
19	Starter clutch gear	1	

GENERATOR AND STARTER CLUTCH

REMOVING THE GENERATOR

1. Remove:

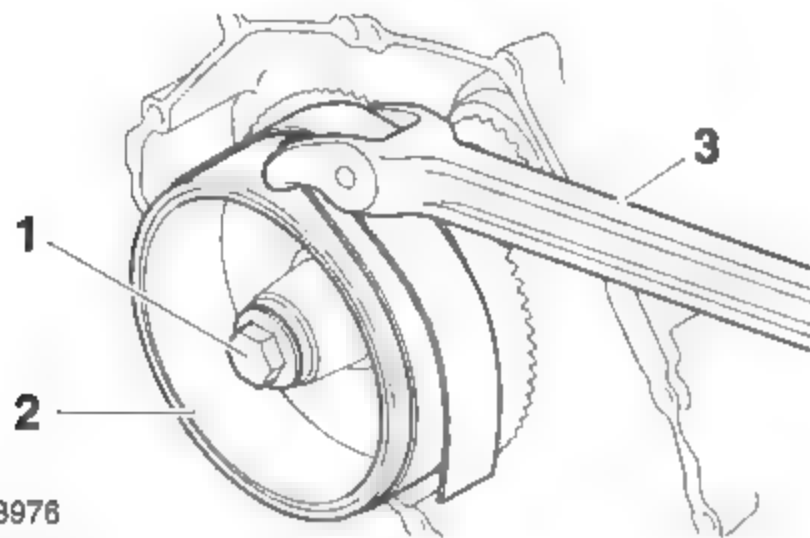
- Generator rotor bolt "1"
- Washer

TIP

While holding the generator rotor "2" with the rotor holding tool "3", loosen the generator rotor bolt.



Rotor holding tool
90890-04166
Rotor holding tool
YM-04166



G088976

2. Remove:

- Generator rotor "1"
- (with the flywheel puller "2")
- Woodruff key

ECA13880

NOTICE

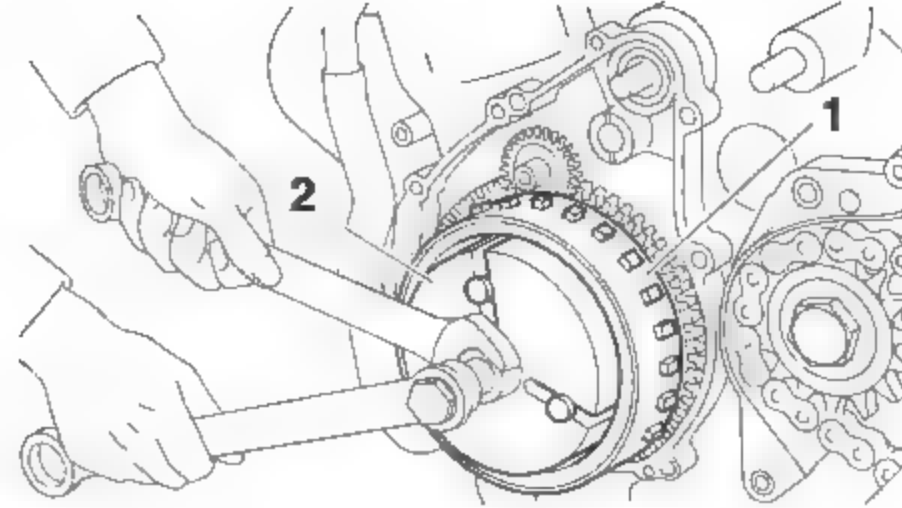
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set center bolt and the crankshaft.

TIP

- Install the flywheel puller bolts to the threaded holes of the starter clutch.
- Make sure the flywheel puller is centered over the generator rotor.



Flywheel puller
90890-01362
Heavy duty puller
YU-33270-B



EAS30868

REMOVING THE STARTER CLUTCH

1. Remove:

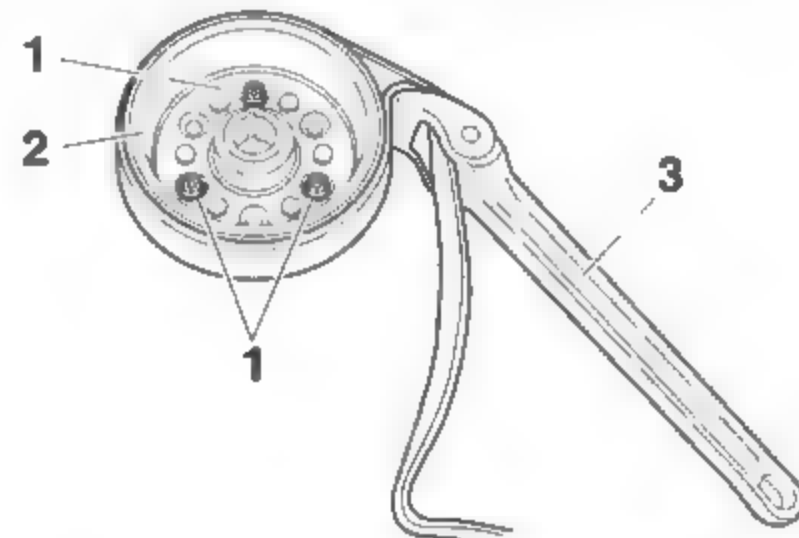
- Starter clutch bolts "1"
- Starter clutch

TIP

While holding the generator rotor "2" with the rotor holding tool "3", loosen the starter clutch bolts.



Rotor holding tool
90890-04166
Rotor holding tool
YM-04166



EAS30889

CHECKING THE STARTER CLUTCH

1. Check:

- Starter clutch rollers
Damage/wear → Replace.

2. Check:

- Starter clutch idle gear
- Starter clutch gear
Burr/chips/roughness/wear → Replace the defective part(s).

3. Check:

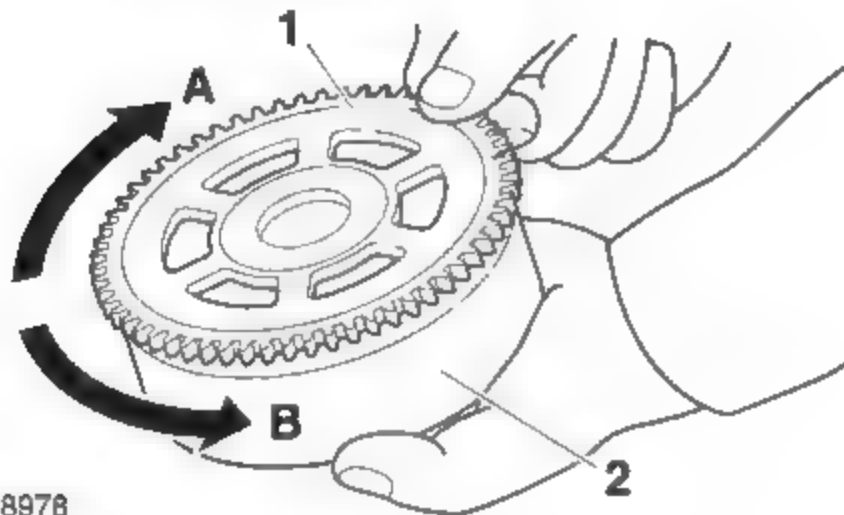
- Starter clutch gear contact surfaces
Damage/pitting/wear → Replace the starter clutch gear.

4. Check:

- Starter clutch operation

GENERATOR AND STARTER CLUTCH

- Install the starter clutch gear "1" onto the generator rotor "2" and hold the generator rotor.
- When turning the starter clutch gear clockwise "A", the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
- When turning the starter clutch gear counterclockwise "B", it should turn freely, otherwise the starter clutch is faulty and must be replaced.



G088978

EAS30870

CHECKING THE TORQUE LIMITER

- Check:
 - Torque limiter
 Damage/wear → Replace.

TIP

Do not disassemble the torque limiter.

EAS30871

INSTALLING THE STARTER CLUTCH

- Install:
 - Starter clutch "1"



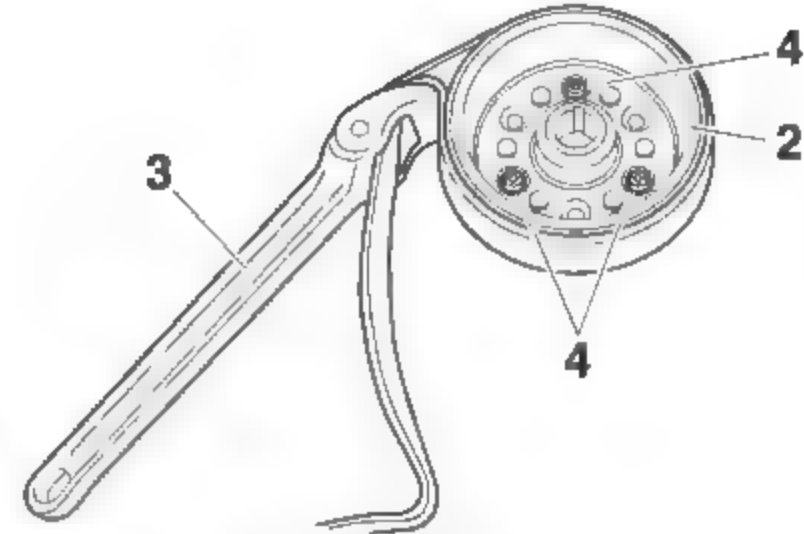
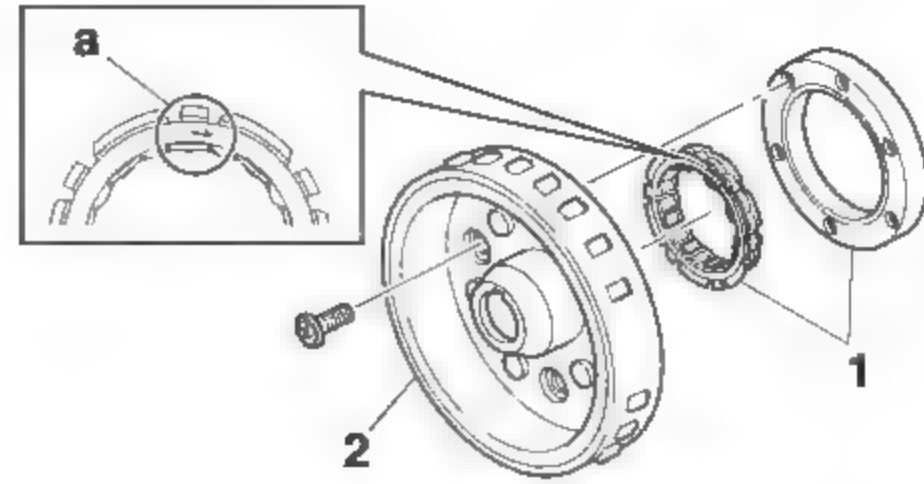
Starter clutch bolt
32 N·m (3.2 kgf·m, 24 lb·ft)
LOCTITE®

TIP

- Install the starter clutch so that the side of the starter clutch roller assembly with the arrow mark "a" is toward the generator rotor "2".
- While holding the generator rotor with the rotor holding tool "3", tighten the starter clutch bolts "4".



Rotor holding tool
90890-04166
Rotor holding tool
YM-04166



EAS30872

INSTALLING THE GENERATOR

- Install:
 - Woodruff key
 - Generator rotor
 - Washer **New**
 - Generator rotor bolt

TIP

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- When installing the generator rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.

- Tighten:
 - Generator rotor bolt "1"



Generator rotor bolt
70 N·m (7.0 kgf·m, 52 lb·ft)

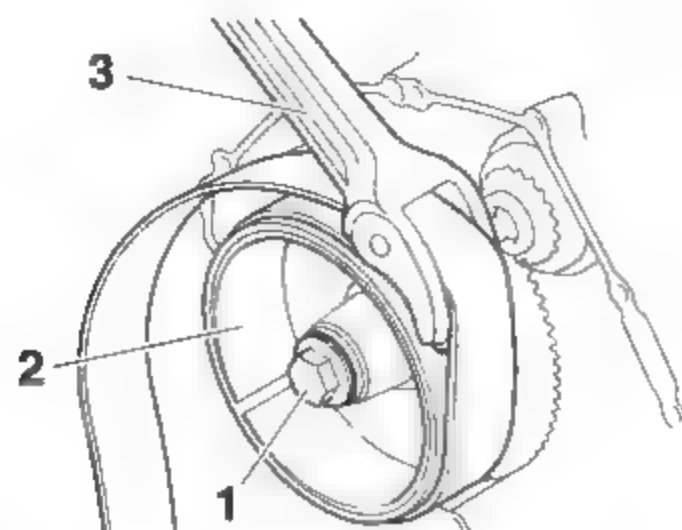
TIP

While holding the generator rotor "2" with the rotor holding tool "3", tighten the generator rotor bolt.



Rotor holding tool
90890-04166
Rotor holding tool
YM-04166

GENERATOR AND STARTER CLUTCH



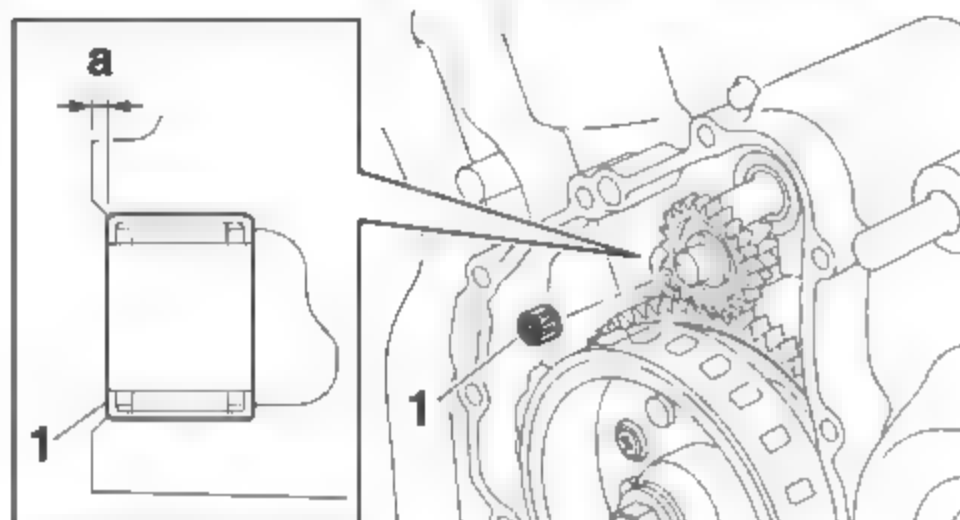
G088979

3. Install:

- Bearing "1"

TIP

Make sure that the bearing does not protrude past the surface "a" of the cylinder.

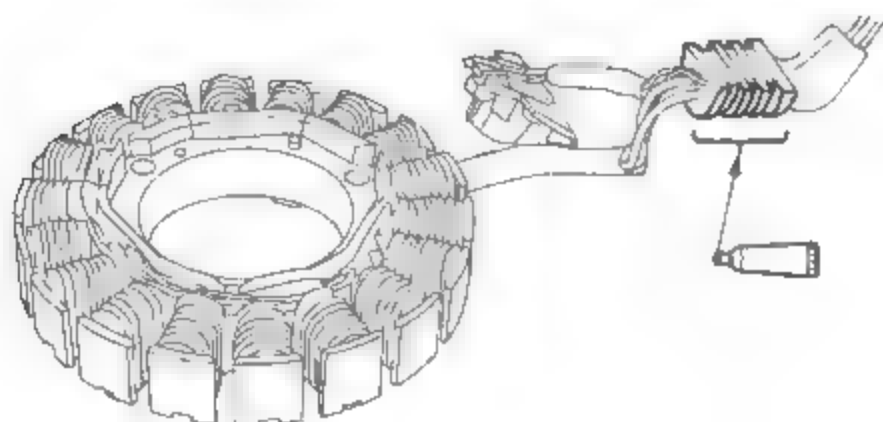


4. Apply:

- Sealant
(onto the stator coil lead grommet)



Yamaha bond No. 1215
90890-85505
Three bond No. 1215®

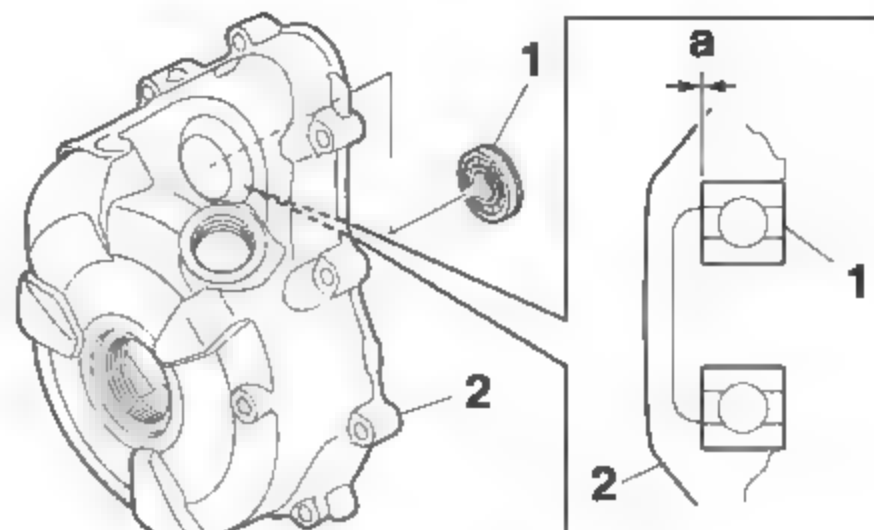


5. Install:

- Bearing "1"

TIP

Make sure that the bearing contacts the surface "a" of the generator cover "2".



6. Install:

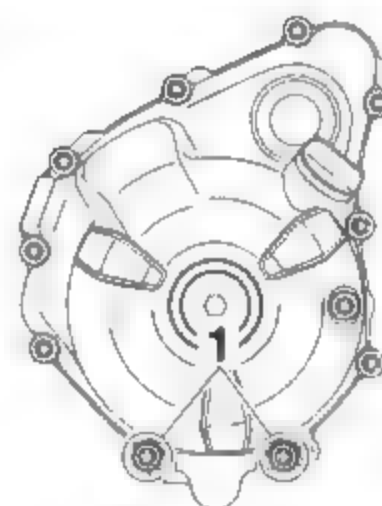
- Generator cover gasket **New**
- Generator cover



Generator cover bolt "1"
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®
Generator cover bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)

TIP

- Tighten the generator cover bolts in stages and in a crisscross pattern.
- Apply LOCTITE® to the threads of only the generator cover bolts "1" shown in the illustration.



7. Connect:

- Stator coil coupler
- Crankshaft position sensor coupler

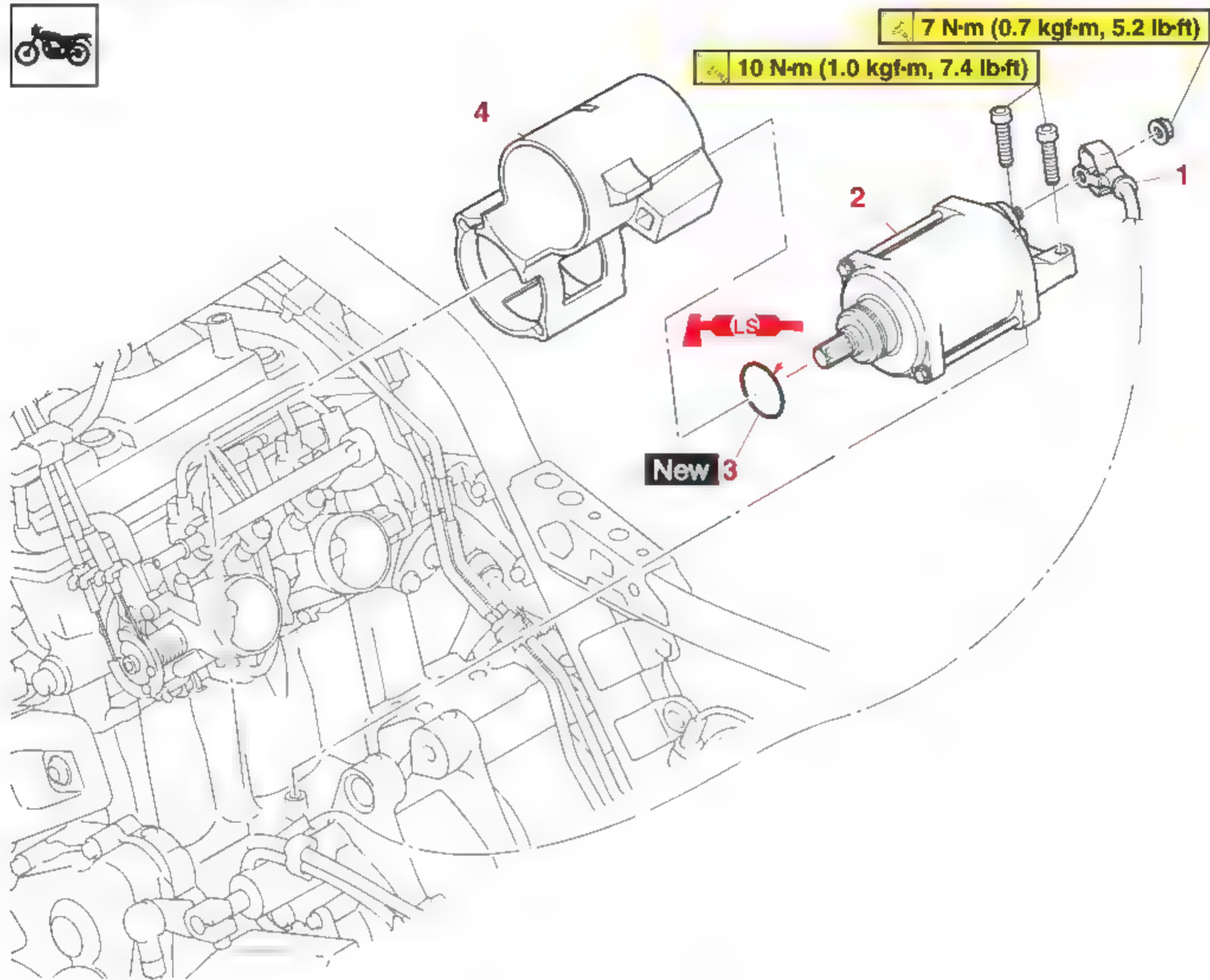
TIP

To route the stator coil lead, refer to "CABLE ROUTING" on page 2-13.

EAS20052

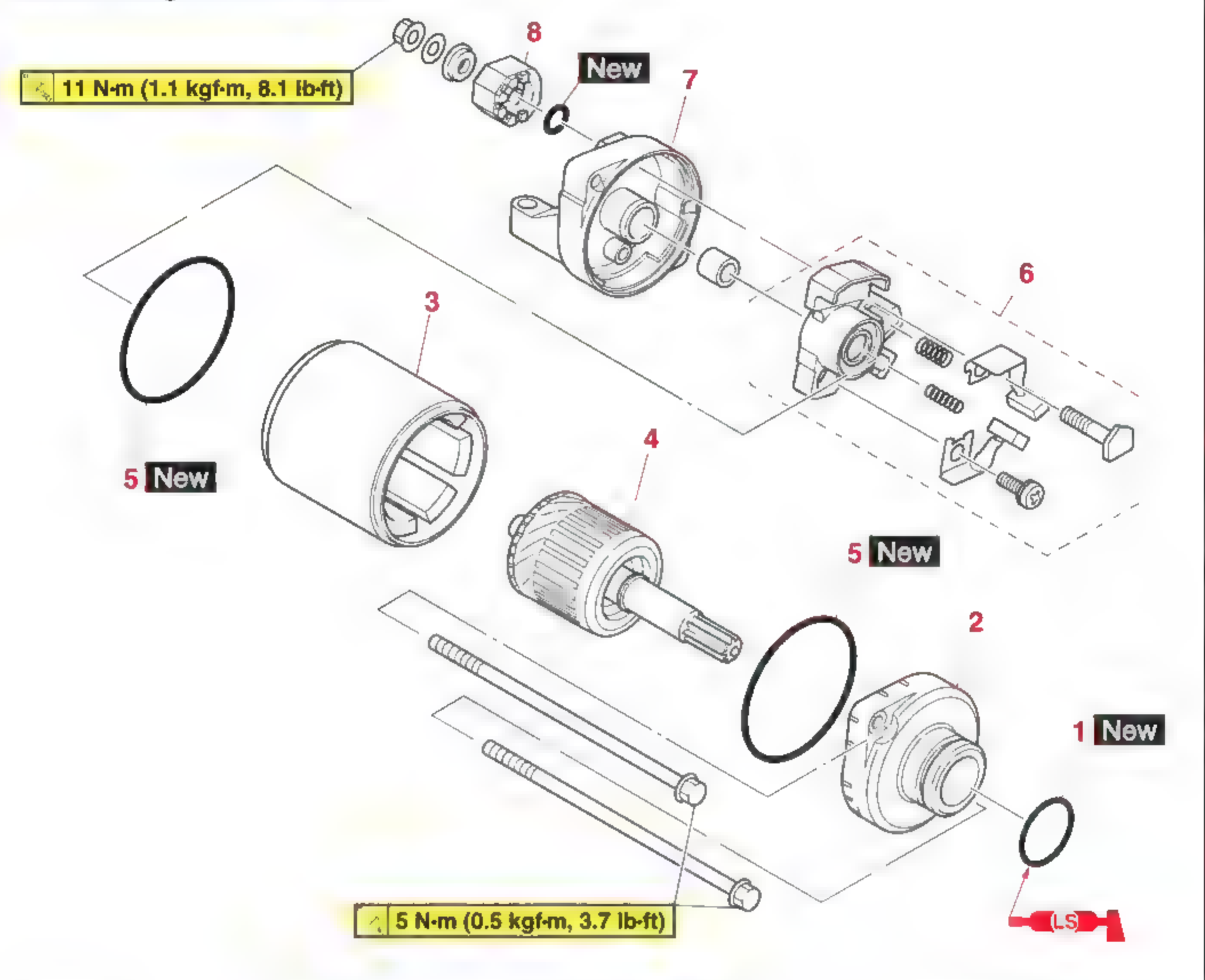
ELECTRIC STARTER

Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Canister		Refer to "FUEL TANK" on page 7-1.
1	Starter motor lead	1	Disconnect.
2	Starter motor	1	
3	O-ring	1	
4	Canister holder	1	

Disassembling the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Starter motor front cover	1	
3	Starter motor yoke	1	
4	Armature assembly	1	
5	Gasket	2	
6	Brush holder set	1	
7	Starter motor rear cover	1	
8	Lead guide	1	

EAS30325

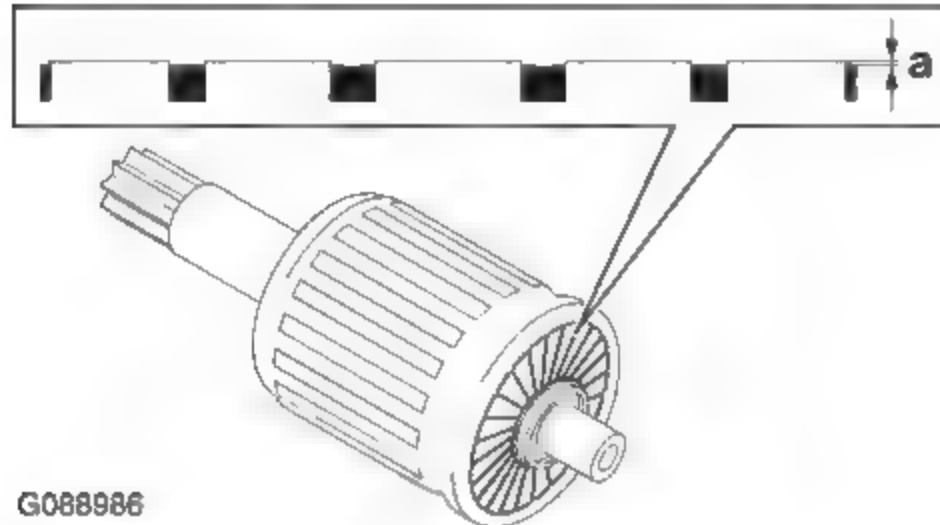
CHECKING THE STARTER MOTOR

1. Check:
 - Commutator
 - Dirt → Clean with 600 grit sandpaper.
2. Measure:
 - Mica undercut "a"
 - Out of specification → Cut the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



TIP

The mica of the commutator must be undercut to ensure proper operation of the commutator.

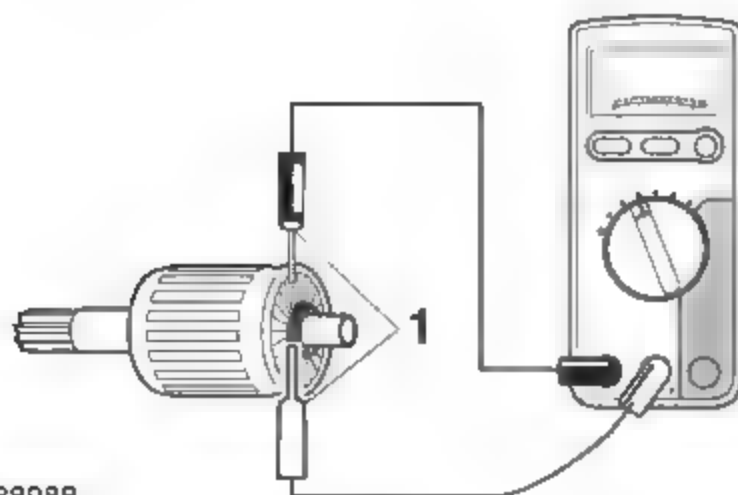


G088986

3. Check:
 - Armature assembly
 - a. Connect the digital circuit tester and check the continuity.

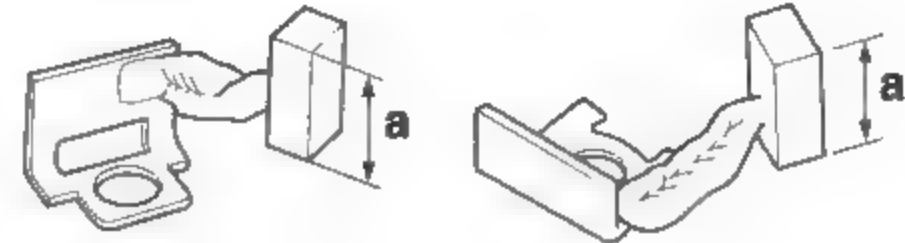


- b. If there is no continuity, replace the starter motor.



G088988

4. Measure:
 - Brush length "a"
 - Out of specification → Replace the brush holder set.



5. Check:
 - Gear teeth
 - Damage/wear → Replace the starter motor.
6. Check:
 - Bearing
 - Oil seal
 - Damage/wear → Replace the starter motor front cover.

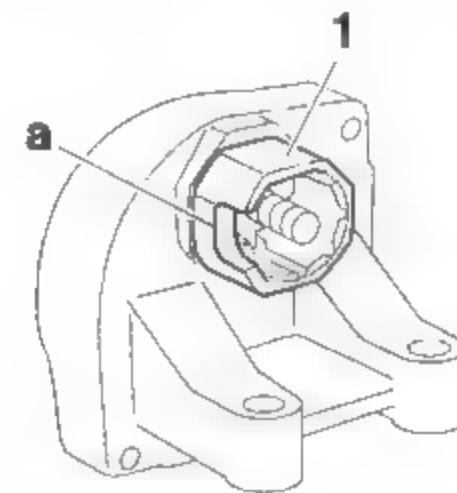
EAS30326

ASSEMBLING THE STARTER MOTOR

1. Install:
 - Lead guide "1"

TIP

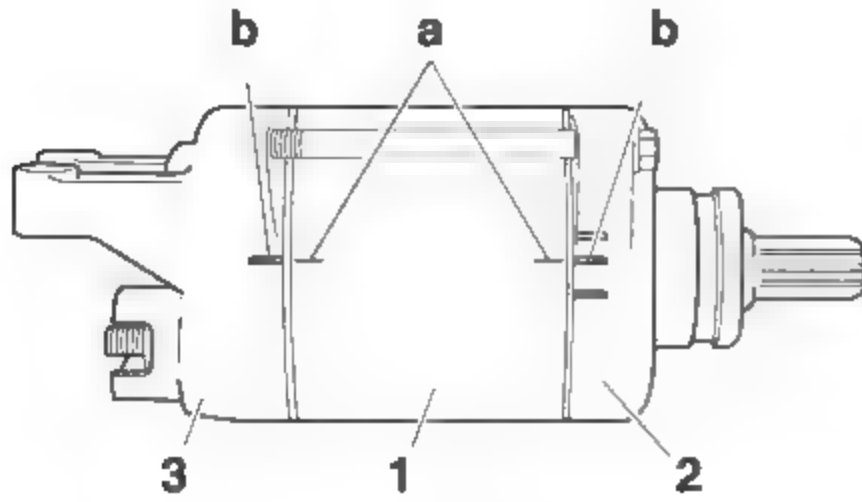
Make sure that the slot "a" in the lead guide is facing in the direction shown in the illustration.



2. Install:
 - Starter motor yoke "1"
 - Starter motor front cover "2"
 - Starter motor rear cover "3"

TIP

Align the match marks "a" on the starter motor yoke with the match marks "b" on the front cover and rear covers.



EAS30327

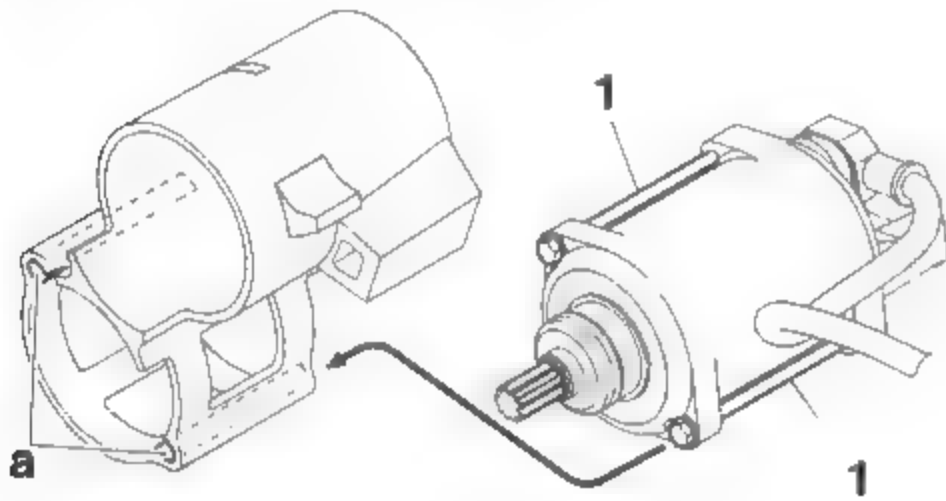
INSTALLING THE STARTER MOTOR

1. Install:

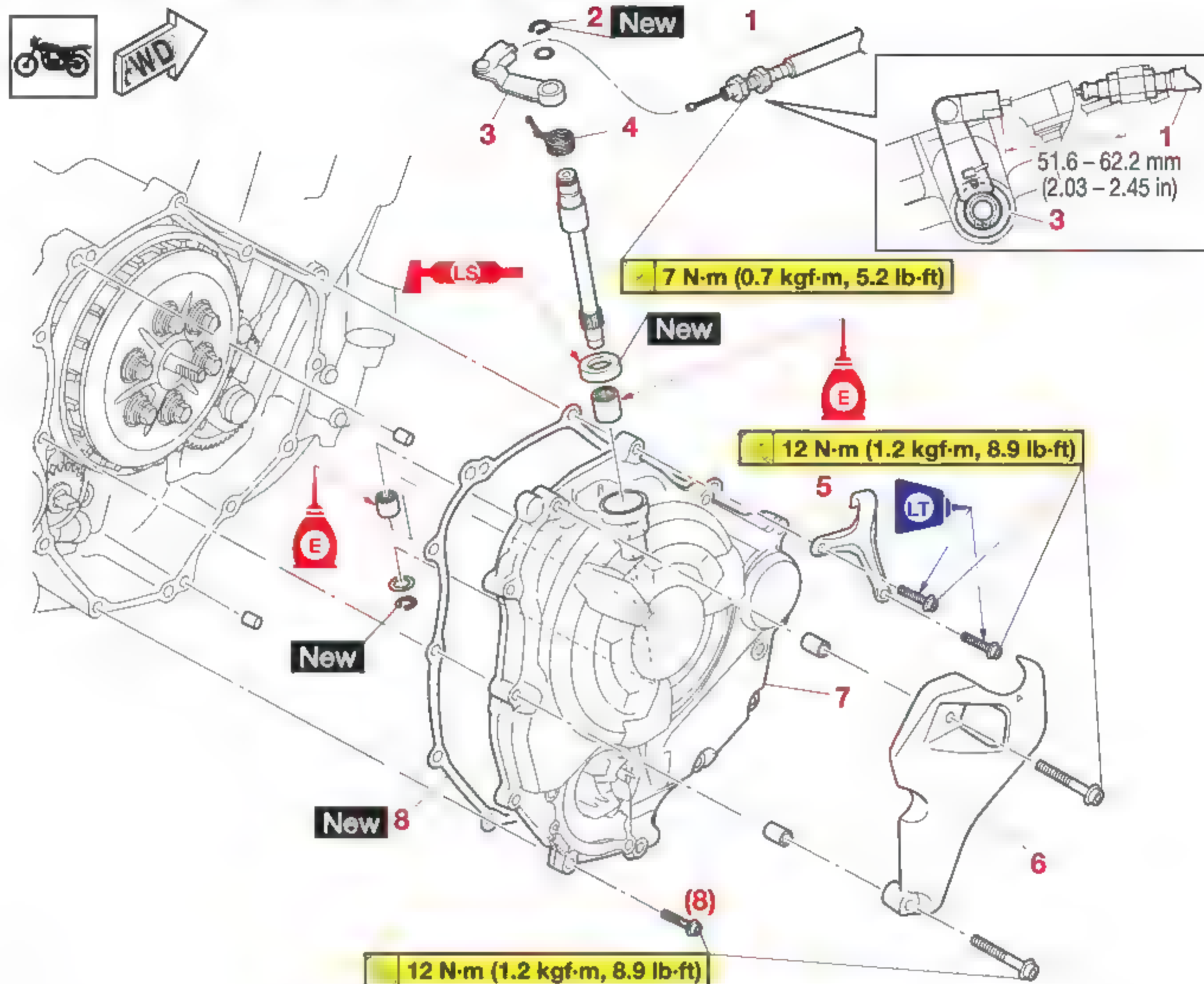
- Canister holder
- Starter motor

TIP

Pass the starter motor front cover bolts "1" through the slots "a" in the canister holder to secure it.

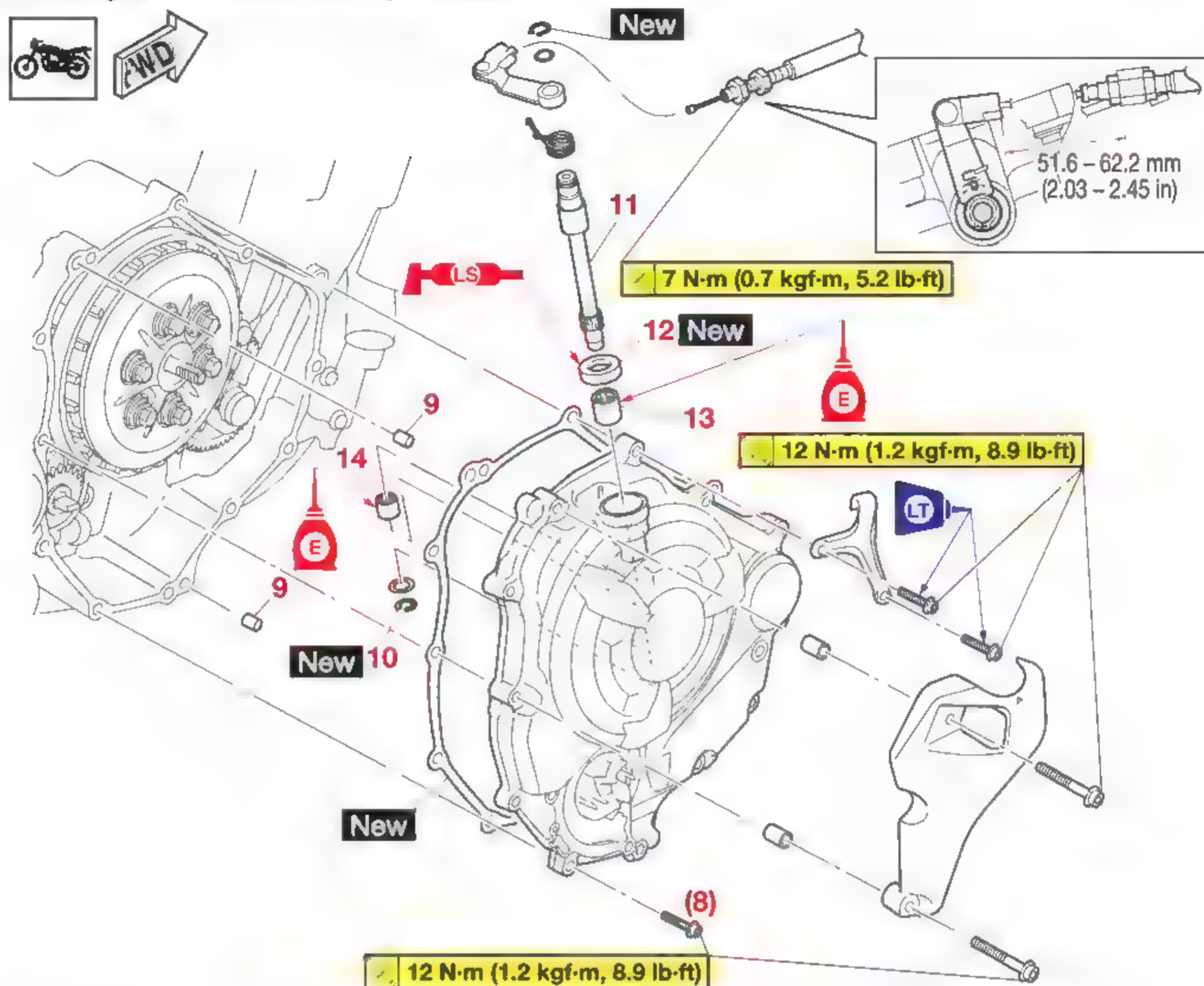


EAS20055

CLUTCH**Removing the clutch cover and pull lever shaft**

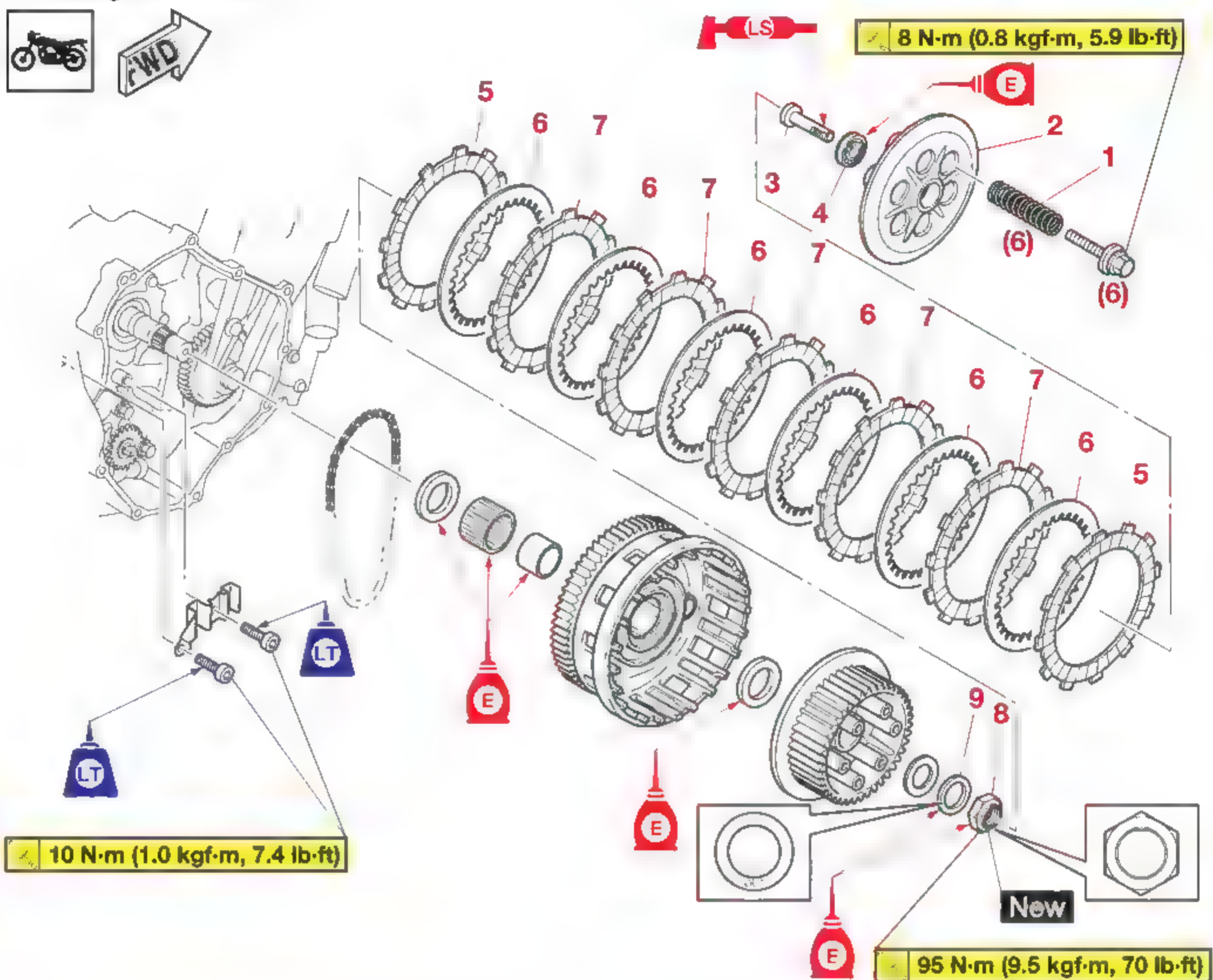
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-28.
	Water pump housing		Refer to "WATER PUMP" on page 6-9.
1	Clutch cable	1	Disconnect.
2	Circlip	1	
3	Pull lever	1	
4	Pull lever spring	1	
5	Clutch cable holder	1	
6	Pull lever shaft cover	1	
7	Clutch cover	1	
8	Clutch cover gasket	1	

Removing the clutch cover and pull lever shaft



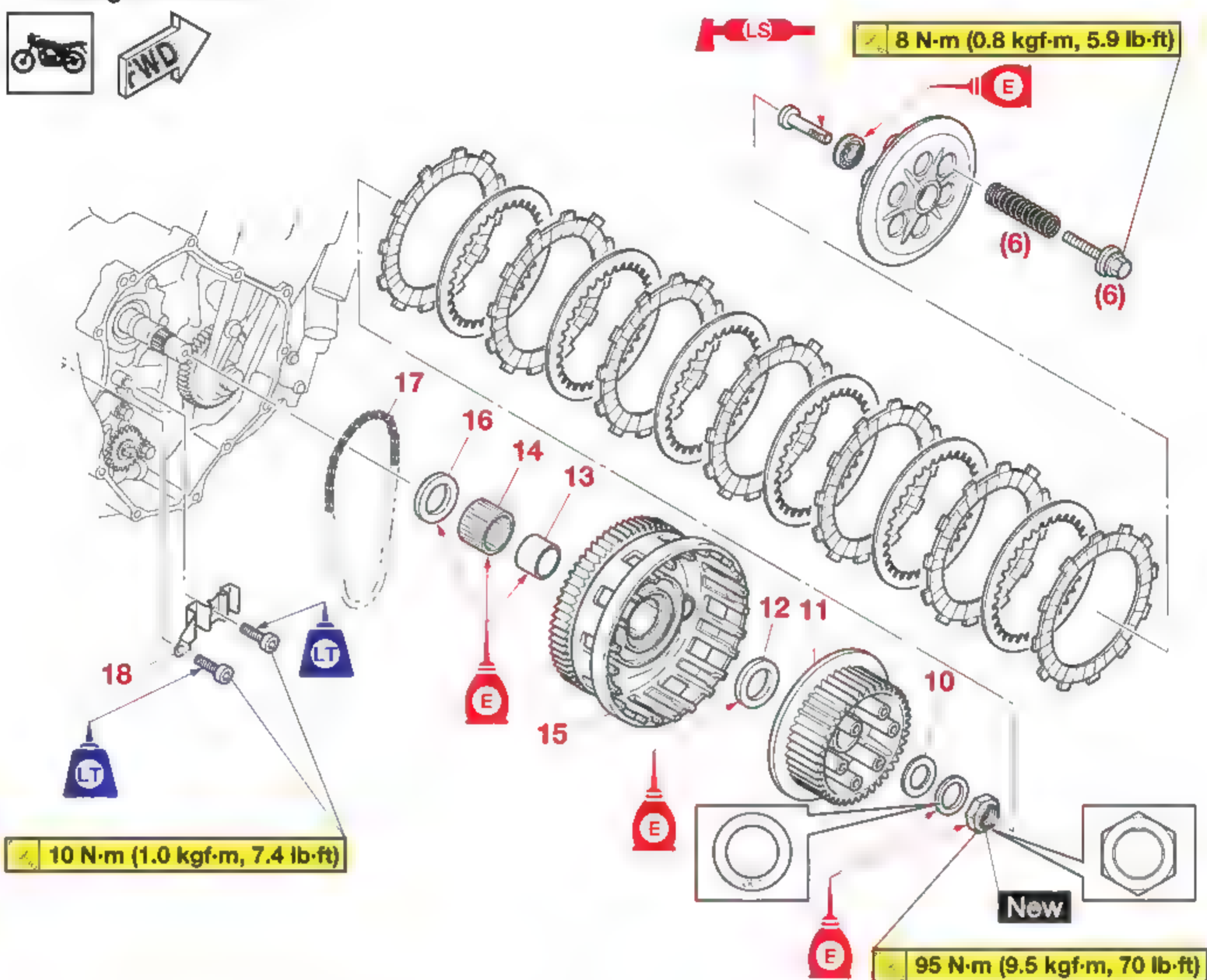
Order	Job/Parts to remove	Q'ty	Remarks
9	Dowel pin	2	
10	Circlip	1	
11	Pull lever shaft	1	
12	Oil seal	1	
13	Bearing	1	
14	Bearing	1	

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Compression spring	6	
2	Pressure plate	1	
3	Pull rod	1	
4	Bearing	1	
5	Friction plate 1	2	
6	Clutch plate	6	
7	Friction plate 2	5	Identification color (purple)
8	Clutch boss nut	1	
9	Conical spring washer	1	

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
10	Washer	1	
11	Clutch boss	1	
12	Thrust plate	1	
13	Spacer	1	
14	Bearing	1	
15	Clutch housing	1	
16	Thrust plate	1	
17	Oil pump drive chain	1	
18	Oil pump drive chain guide	1	

EAS30348

REMOVING THE CLUTCH

1. Remove:

- Clutch cover
- Gasket

TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

2. Remove:

- Compression spring bolts
- Compression springs
- Pressure plate
- Pull rod

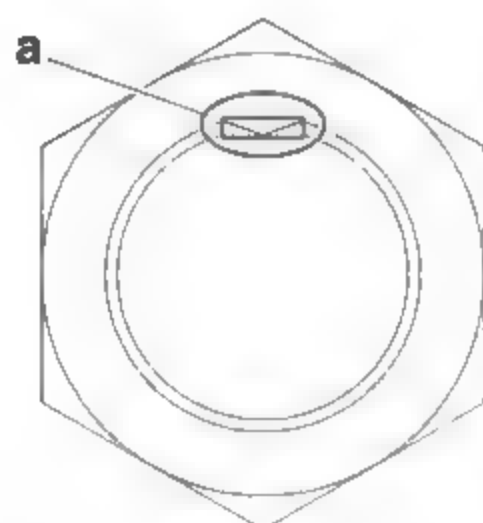
TIP

Loosen the compression spring bolts in stages and in a crisscross pattern.

3. Remove:

- Friction plates 1
- Clutch plates
- Friction plates 2

4. Straighten the clutch boss nut rib "a".



G088991

5. Loosen:

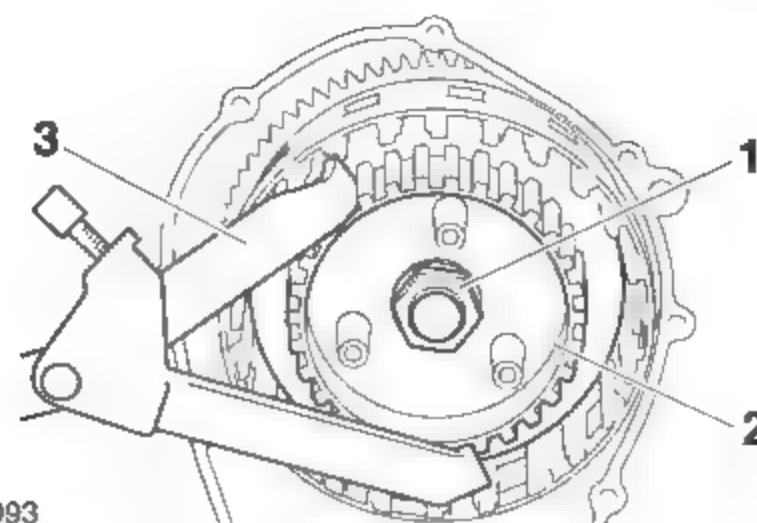
- Clutch boss nut "1"

TIP

While holding the clutch boss "2" with the universal clutch holder "3", loosen the clutch boss nut.



Clutch holder
90890-04199
Universal clutch holder
YM-91042



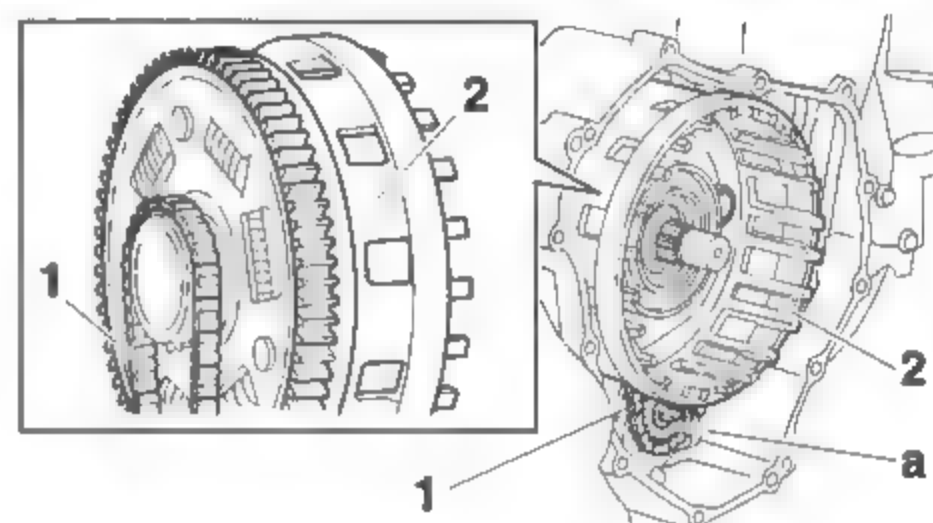
G088993

6. Remove:

- Spacer
- Bearing
- Clutch housing

a. Remove the spacer and bearing.

b. Remove the oil pump drive chain "1" from the oil pump driven sprocket "a", and then remove the clutch housing "2".



EAS30348

CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

1. Check:

- Friction plate
Damage/wear → Replace the friction plates as a set.

2. Measure:

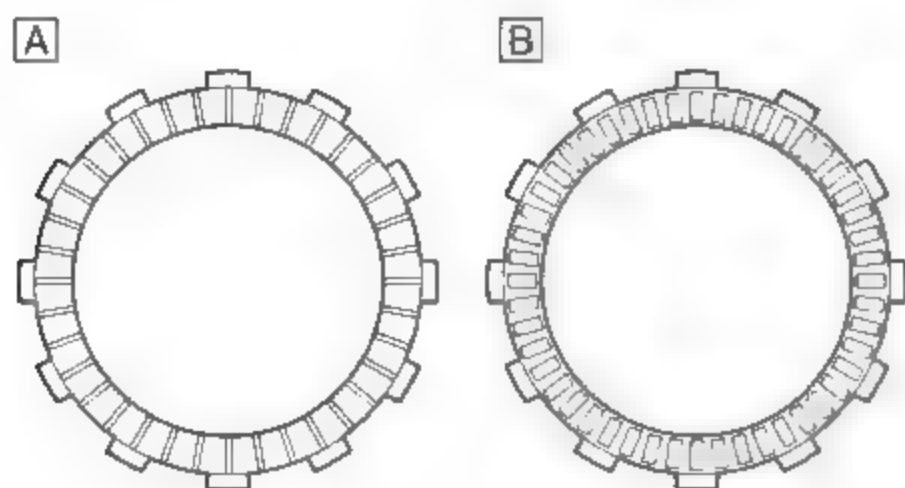
- Friction plate thickness
Out of specification → Replace the friction plates as a set.

TIP

Measure the friction plate at four places.



Friction plate 1 thickness
2.90–3.10 mm (0.114–0.122 in)
Wear limit
2.80 mm (0.110 in)
Friction plate 2 thickness
2.92–3.08 mm (0.115–0.121 in)
Wear limit
2.82 mm (0.111 in)



A. Friction plate 1
B. Friction plate 2

EAS30349

CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:
 - Clutch plate
Damage → Replace the clutch plates as a set.
2. Measure:
 - Clutch plate warpage
(with a surface plate and thickness gauge)
Out of specification → Replace the clutch plates as a set.

	Thickness gauge 90890-03268 Feeler gauge set YU-26900-9
--	----------------------------------------------------------------------------------------------

	Warpage limit 0.10 mm (0.004 in)
--	---------------------------------------------------

EAS30351

CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

1. Check:
 - Clutch spring
Damage → Replace the clutch springs as a set.
2. Measure:
 - Clutch spring free length
Out of specification → Replace the clutch springs as a set.

	Clutch spring free length limit 47.50 mm (1.87 in)
--	---------------------------------------------------------------------

EAS30352

CHECKING THE CLUTCH HOUSING

1. Check:
 - Clutch housing dogs
Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

TIP

Pitting on the clutch housing dogs will cause erratic clutch operation.

2. Check:
 - Oil pump drive sprocket
Cracks/damage/wear → Replace.
3. Check:
 - Bearing
Damage/wear → Replace the bearing and clutch housing.

EAS30353

CHECKING THE CLUTCH BOSS

1. Check:
 - Clutch boss splines
Damage/pitting/wear → Replace the clutch boss.

TIP

Pitting on the clutch boss splines will cause erratic clutch operation.

EAS30354

CHECKING THE PRESSURE PLATE

1. Check:
 - Pressure plate
Cracks/damage → Replace.
 - Bearing
Damage/wear → Replace.

EAS30356

CHECKING THE PRIMARY DRIVE GEAR

1. Check:
 - Primary drive gear
Damage/wear → Replace the crankshaft and clutch housing as a set.
Excessive noise during operation → Replace the crankshaft and clutch housing as a set.

EAS30357

CHECKING THE PRIMARY DRIVEN GEAR

1. Check:
 - Primary driven gear
Damage/wear → Replace the clutch housing and crankshaft as a set.
Excessive noise during operation → Replace the clutch housing and crankshaft as a set.

EAS30358

CHECKING THE PULL LEVER SHAFT AND PULL ROD

1. Check:

- Pull lever shaft pinion gear teeth
- Pull rod teeth

Damage/wear → Replace the pull rod and pull lever shaft as a set.

2. Check:

- Pull rod bearing

Damage/wear → Replace.

EAS30363

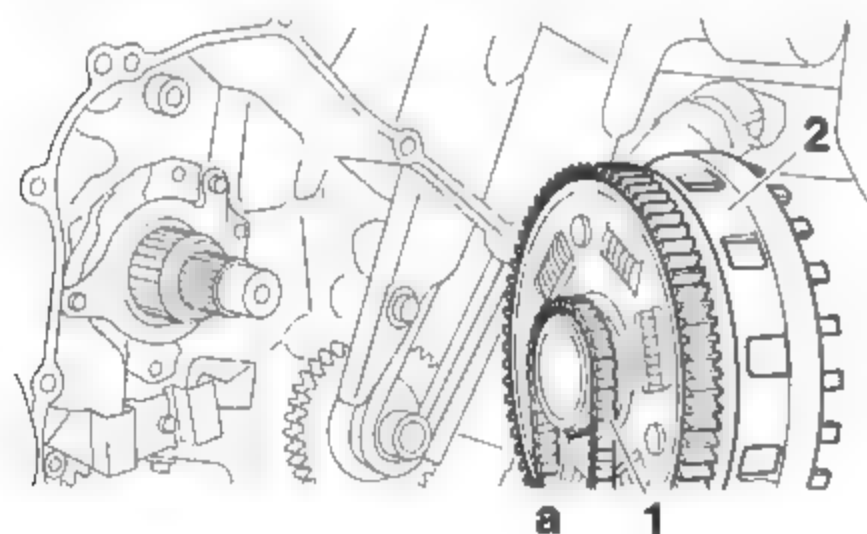
INSTALLING THE CLUTCH

1. Install:

- Oil pump drive chain "1"
- Thrust plate
- Clutch housing "2"
- Bearing
- Spacer

TIP

Install the oil pump drive chain onto the oil pump drive sprocket "a".



2. Install:

- Thrust plate
- Clutch boss "1"
- Washer
- Conical spring washer
- Clutch boss nut "2" **New**



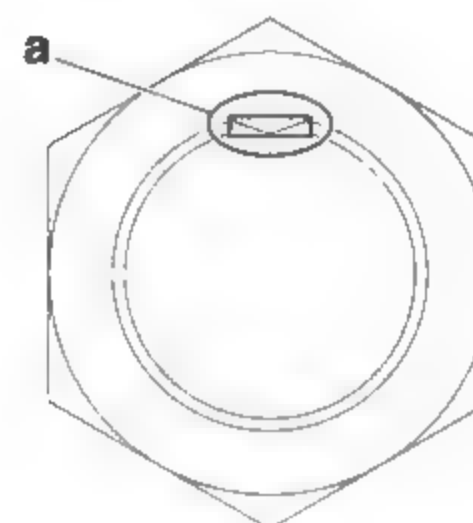
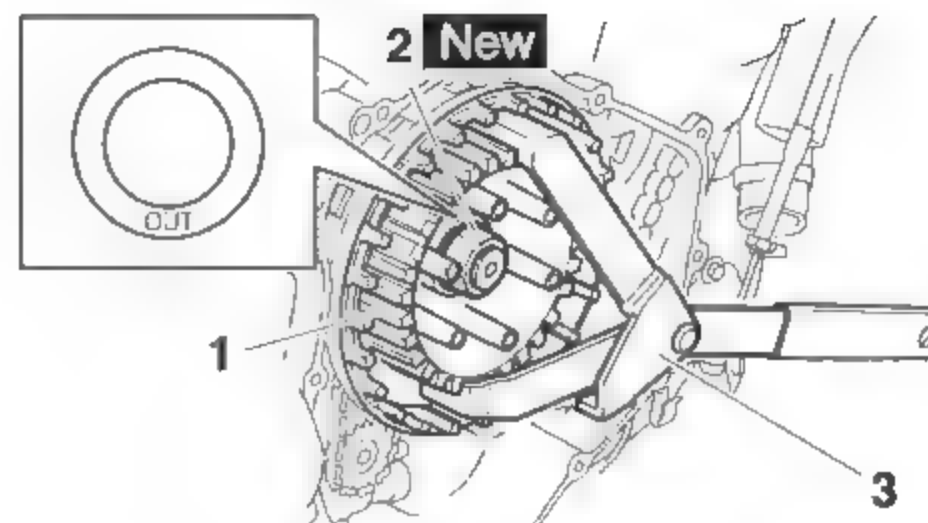
Clutch boss nut
95 N·m (9.5 kgf·m, 70 lb·ft)

TIP

- Lubricate the conical spring washer and clutch boss nut threads with engine oil.
- Install the washer on the main axle with the "OUT" mark facing away from the vehicle.
- While holding the clutch boss "1" with the universal clutch holder "3", tighten the clutch boss nut.
- Stake the clutch boss nut at a cutout "a" in the main axle.



Clutch holder
90890-04199
Universal clutch holder
YM-91042

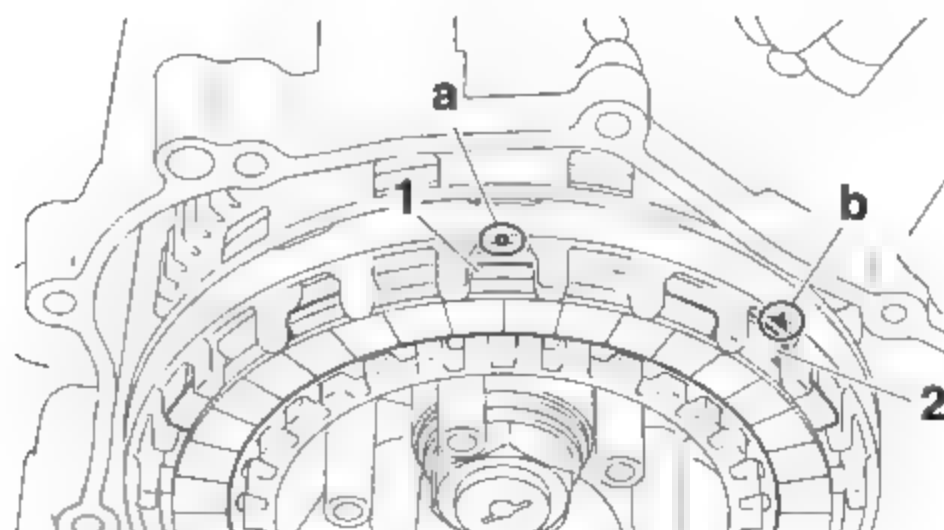


3. Install:

- Friction plates 1 "1"
- Friction plates 2 "2"

TIP

- First, install a friction plate, and then alternate between a clutch plate and a friction plate.
- Align a projection on friction plate 1 with the punch mark "a" on the clutch housing and align a projection on friction plate 2 with the "Δ" mark "b" on the housing.



4. Install:

- Bearing
- Pull rod
- Pressure plate
- Clutch springs
- Clutch spring bolts



Clutch spring bolt
8 N·m (0.8 kgf·m, 5.9 lb·ft)

TIP

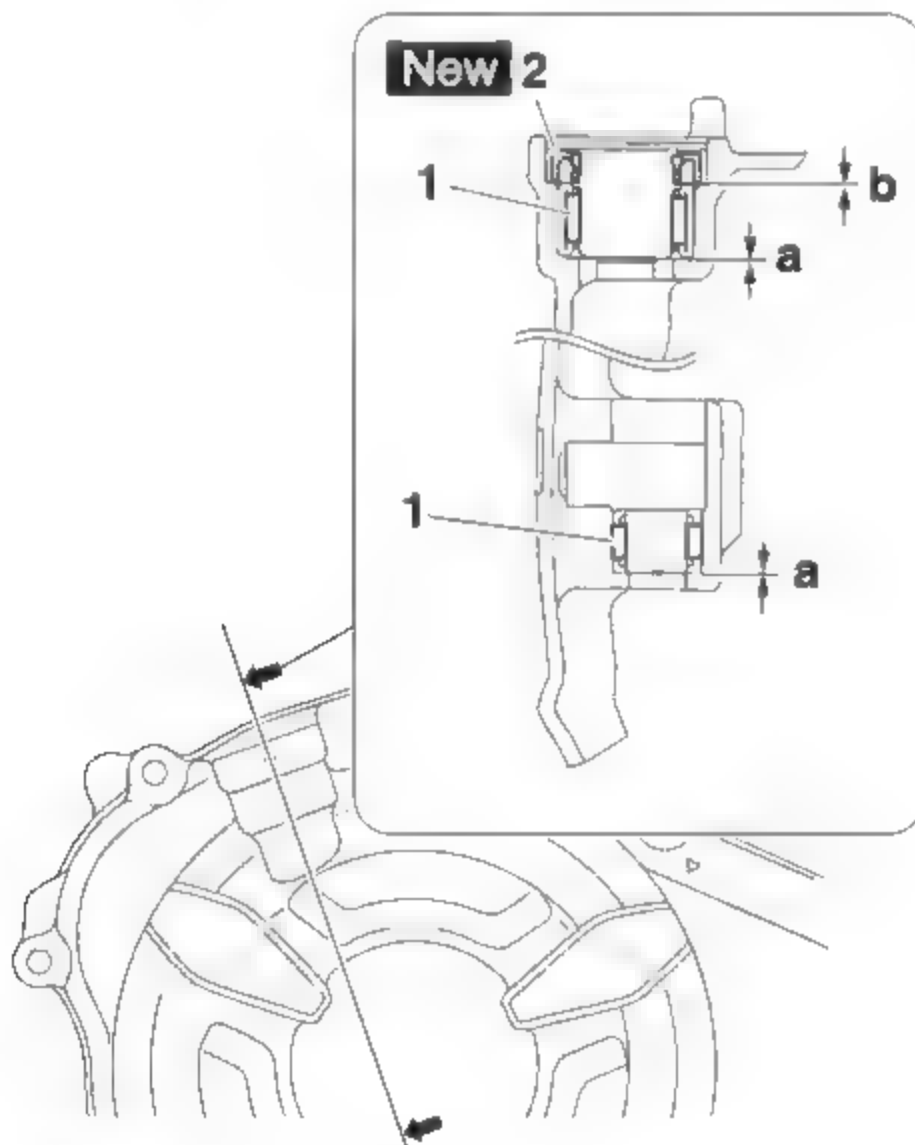
- Apply lithium-soap-based grease onto the pull rod.
- Tighten the clutch spring bolts in stages and in a crisscross pattern.

5. Install:

- Bearings "1"
- Oil seal "2" **New**
(to the clutch cover)

TIP

- Lubricate the bearings with engine oil and lubricate the oil seal with lithium-soap-based grease.
- Install the bearings until they contact the surfaces "a" and install the oil seal until it contacts the surface "b" as shown in the illustration.



6. Install:

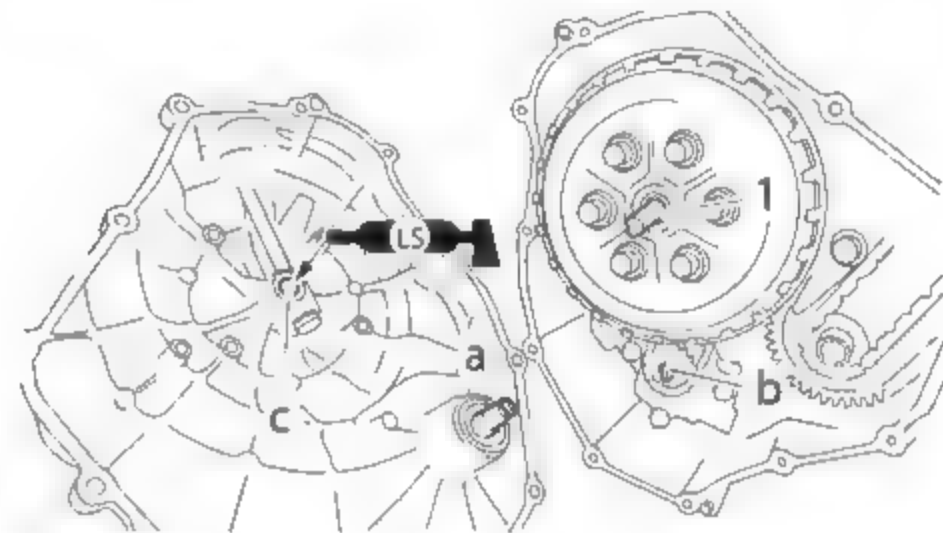
- Dowel pins
- Clutch cover gasket **New**
- Clutch cover
- Pull lever shaft cover
- Clutch cable holder



Clutch cover bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)
Clutch cable holder bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®

TIP

- Align the slit "a" in the impeller shaft with the projection "b" on the oil pump driven sprocket.
- Face the serrations on the clutch pull rod "1" rearward and align the rod with the hole "c" in the clutch cover.
- Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.
- Tighten the bolts in stages and in a crisscross pattern.

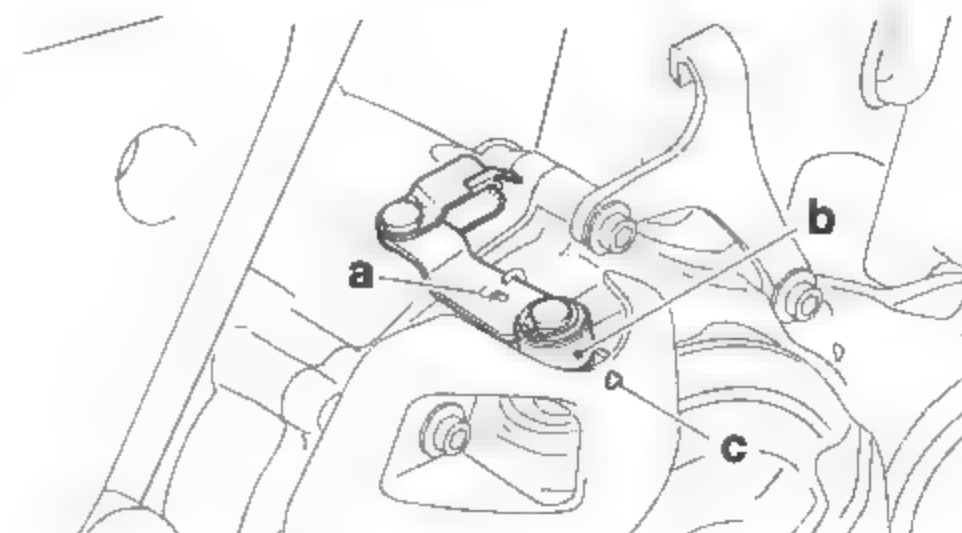


7. Install:

- Pull lever

TIP

- Install the pull lever with the "UP" mark "a" facing toward upper side.
- When installing the pull lever, push the pull lever and check that the punch mark "b" on the pull lever aligns with the mark "c" on the pull lever shaft cover.



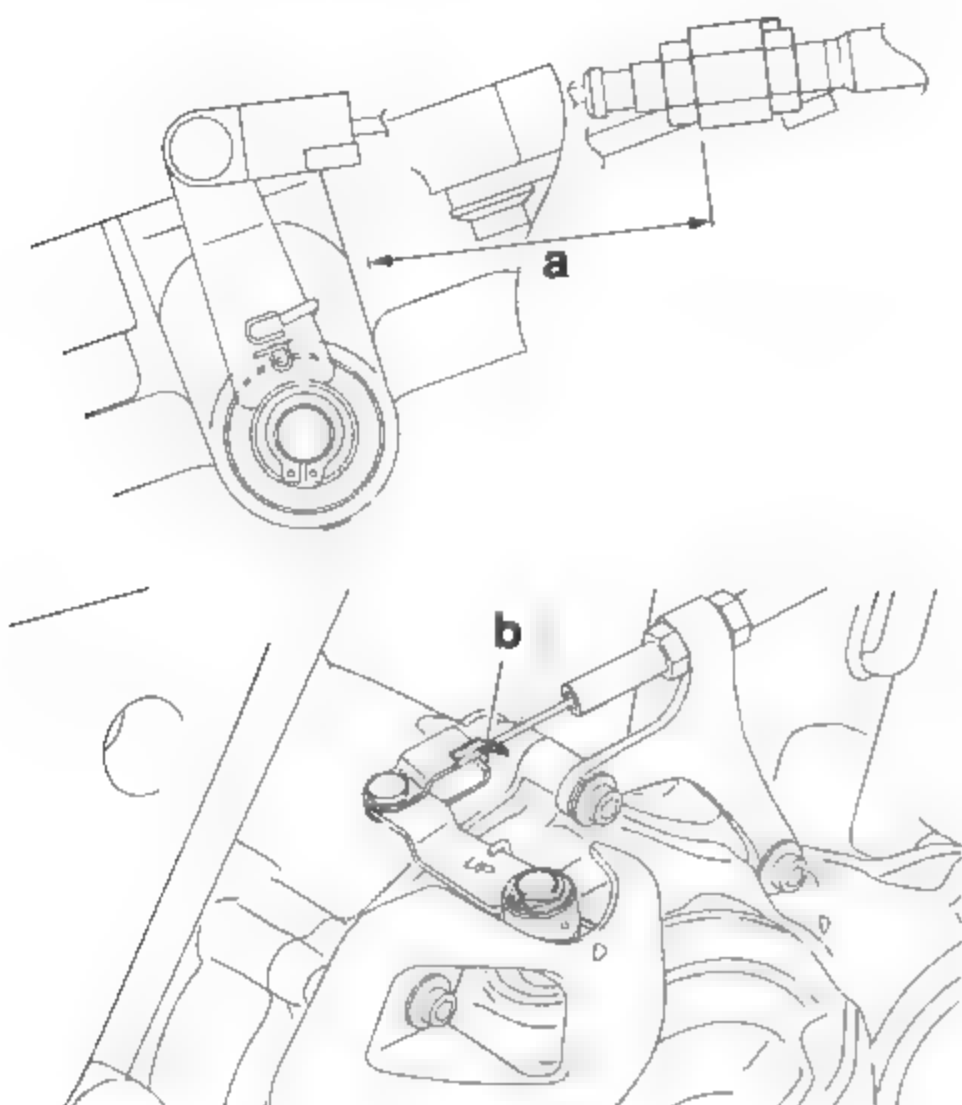
8. Connect:

- Clutch cable

TIP

- Install the clutch cable so that the clutch cable length "a" is 51.6–62.2 mm (2.03–2.45 in) as shown in the illustration.

- After installing the clutch cable, bend the projection "b" on the pull lever.



9. Adjust:

- Clutch lever free play
Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-13.

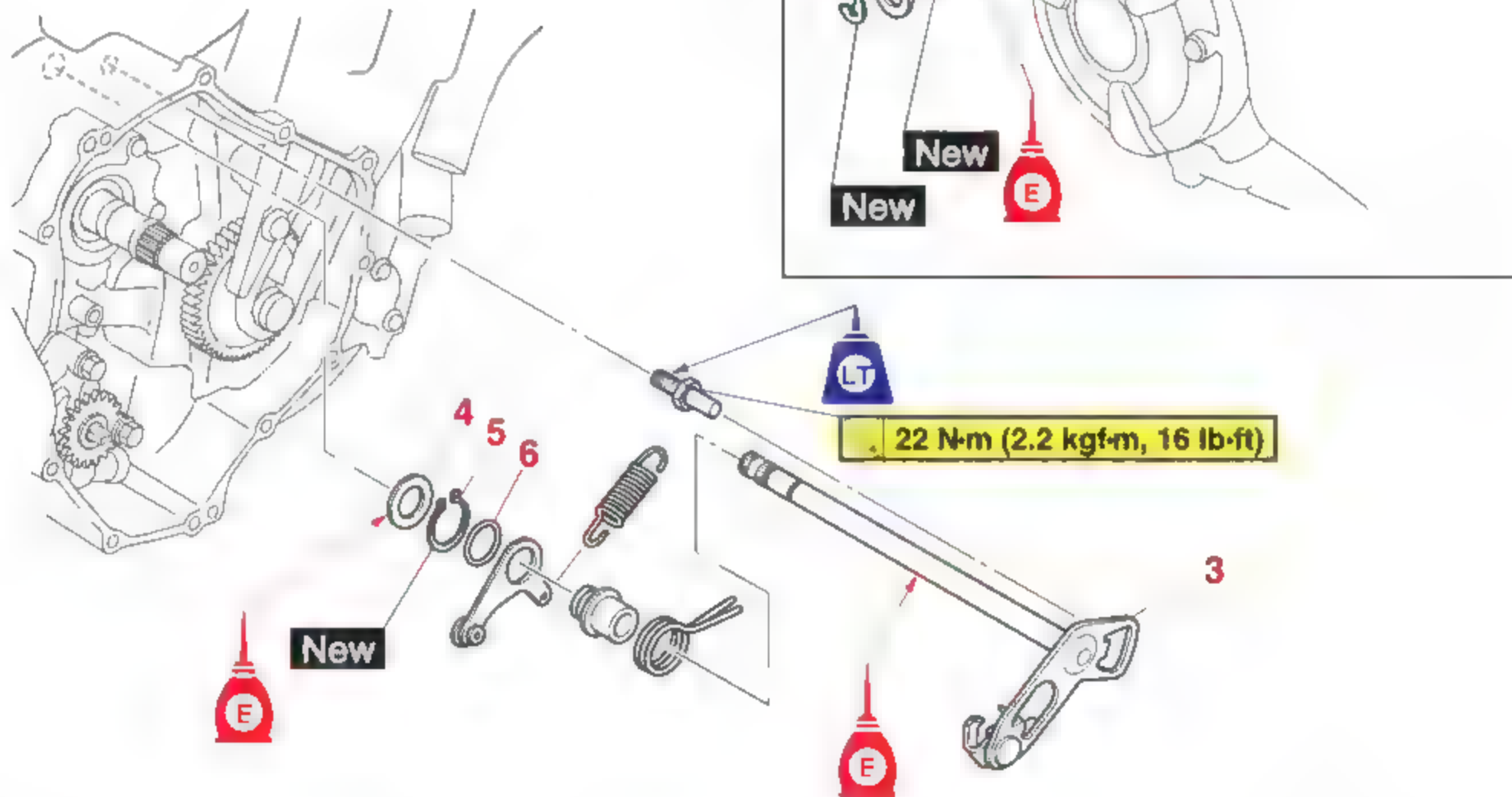


Clutch lever free play
5.0–10.0 mm (0.20–0.39 in)

EAS20057

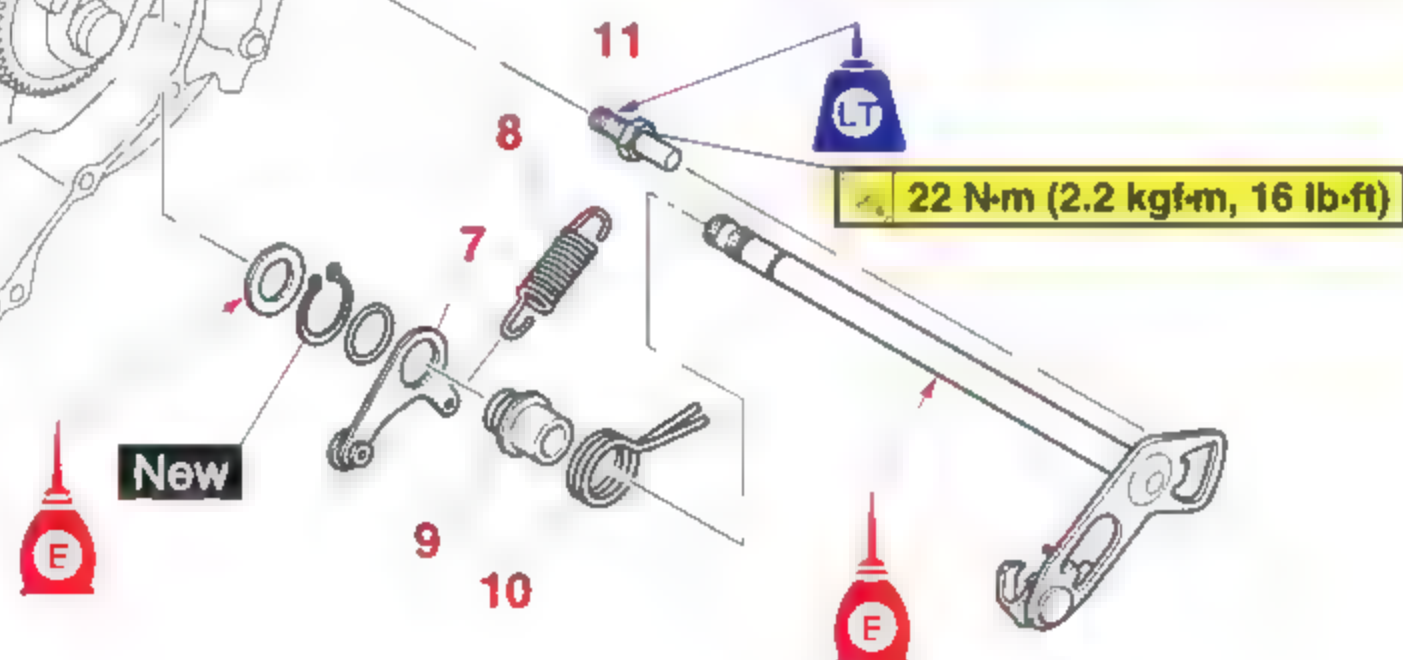
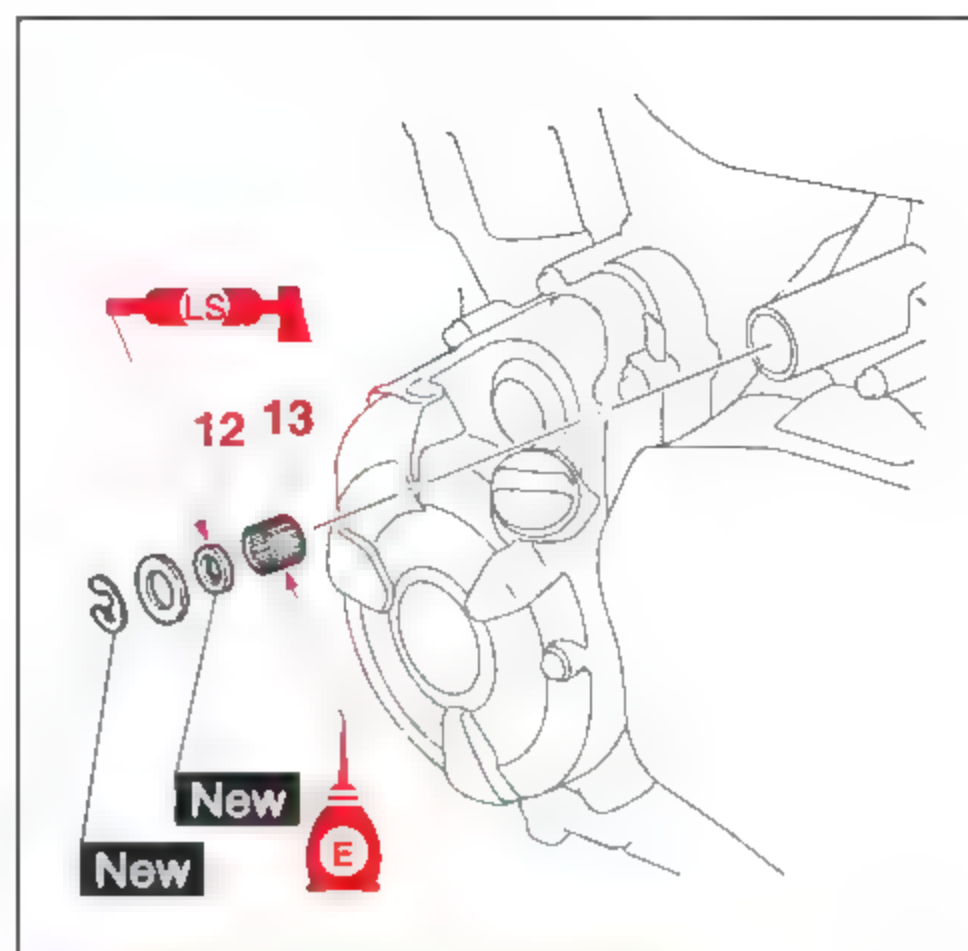
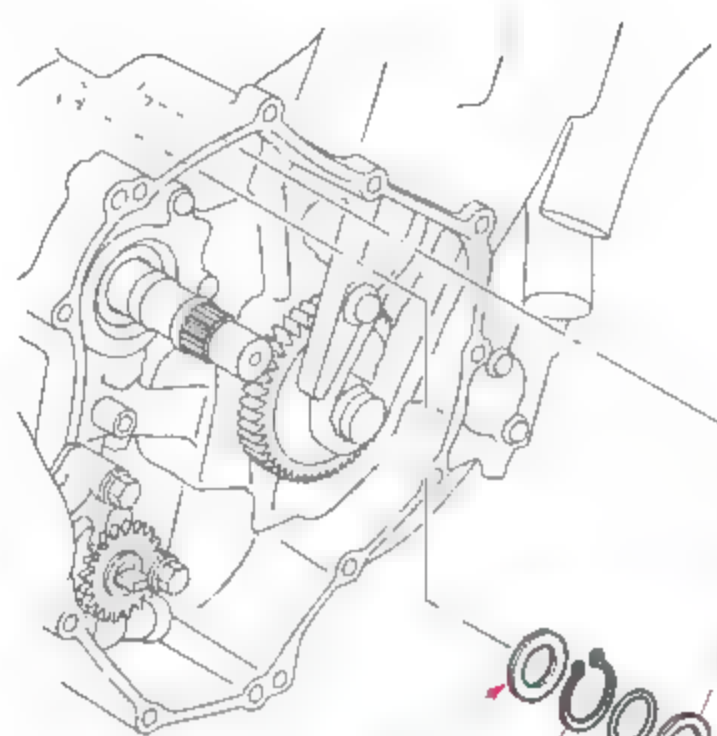
SHIFT SHAFT

Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-28.
	Shift arm		Refer to "CHAIN DRIVE" on page 4-87.
	Water pump housing		Refer to "WATER PUMP" on page 6-9.
	Clutch housing		Refer to "CLUTCH" on page 5-52.
1	Circlip	1	
2	Washer	1	
3	Shift shaft	1	
4	Washer	1	
5	Circlip	1	
6	Washer	1	

Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
7	Stopper lever	1	
8	Stopper lever spring	1	
9	Collar	1	
10	Shift shaft spring	1	
11	Shift shaft spring stopper	1	
12	Oil seal	1	
13	Bearing	1	

EAS30377

CHECKING THE SHIFT SHAFT

1. Check:
 - Shift shaft
Bends/damage/wear → Replace.
 - Shift shaft spring
 - Collar
Damage/wear → Replace.

EAS30378

CHECKING THE STOPPER LEVER

1. Check:
 - Stopper lever
Bends/damage → Replace.
Roller turns roughly → Replace the stopper lever.

EAS30381

INSTALLING THE SHIFT SHAFT

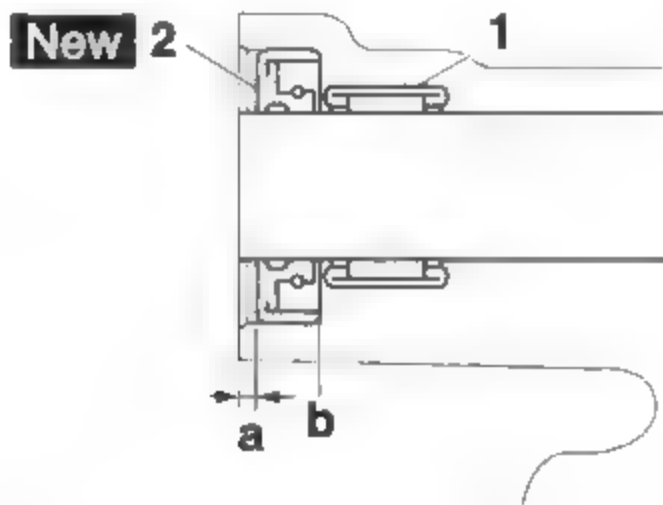
1. Install:
 - Bearing "1"
 - Oil seal "2" **New**



Install depth "a"
0.6–1.1 mm (0.02–0.04 in)

TIP

- Apply engine oil onto the bearing.
- Make sure that the bearing does not protrude past the line "b" shown in the illustration.
- Lubricate the oil seal lips with lithium-soap-based grease.



2. Install:
 - Shift shaft spring stopper
 - Washer
 - Shift shaft assembly
 - Stopper lever spring

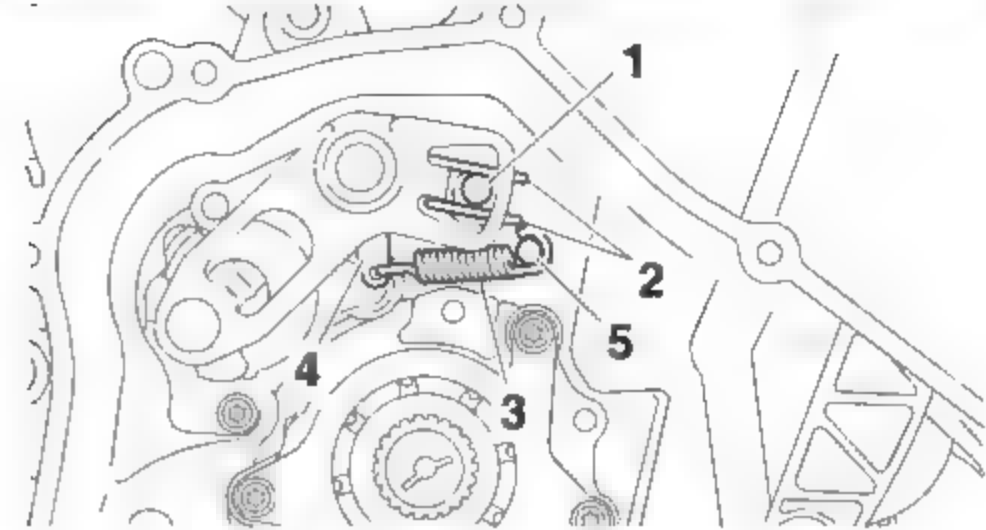


Shift shaft spring stopper
22 N·m (2.2 kgf·m, 16 lb·ft)
LOCTITE®

TIP

- Hook the end of the shift shaft spring "2" onto the shift shaft spring stopper "1".

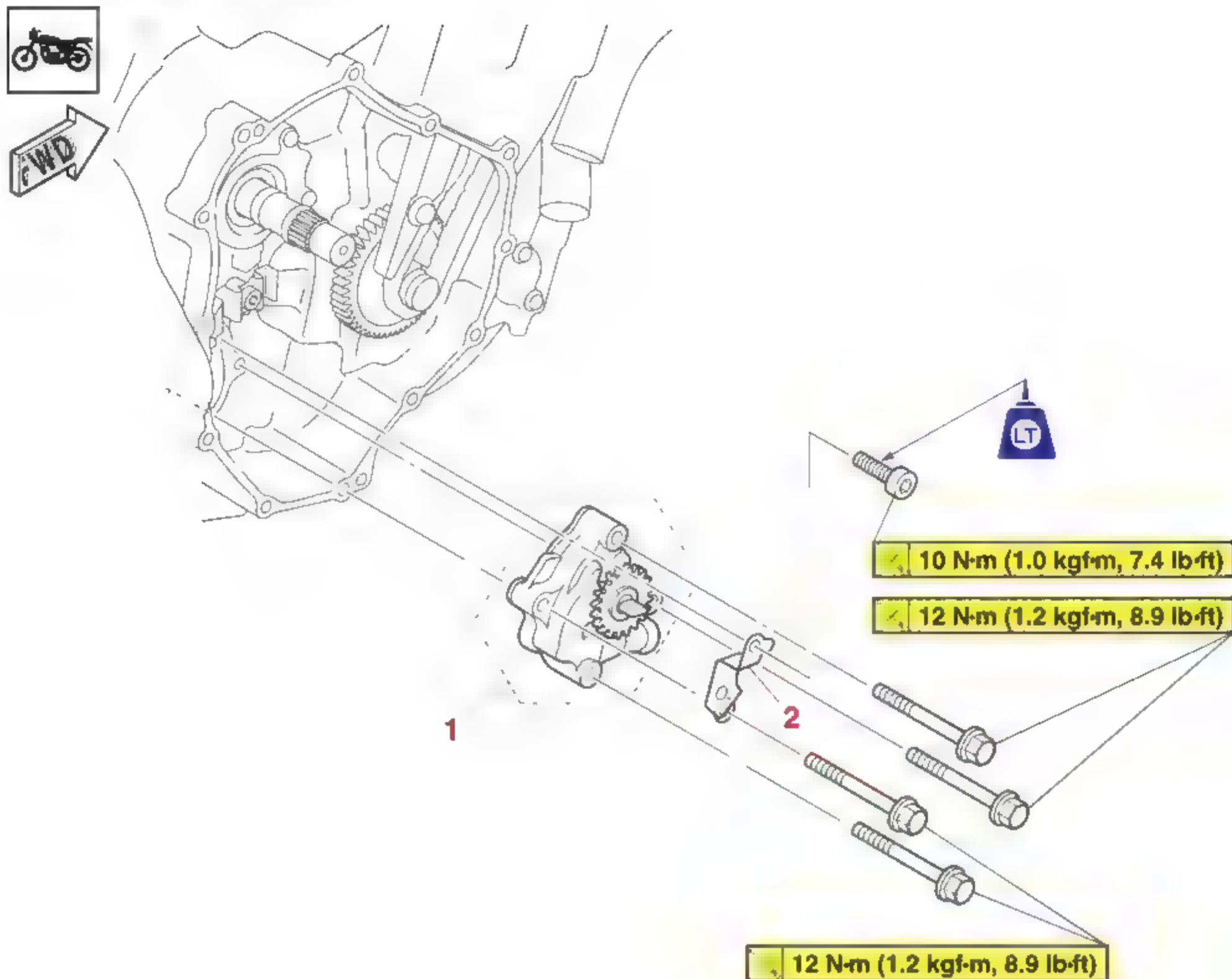
- Hook the ends of the stopper lever spring "3" onto the stopper lever "4" and the stopper lever spring hook "5".
- Mesh the stopper lever with the shift drum segment assembly.



EAS20054

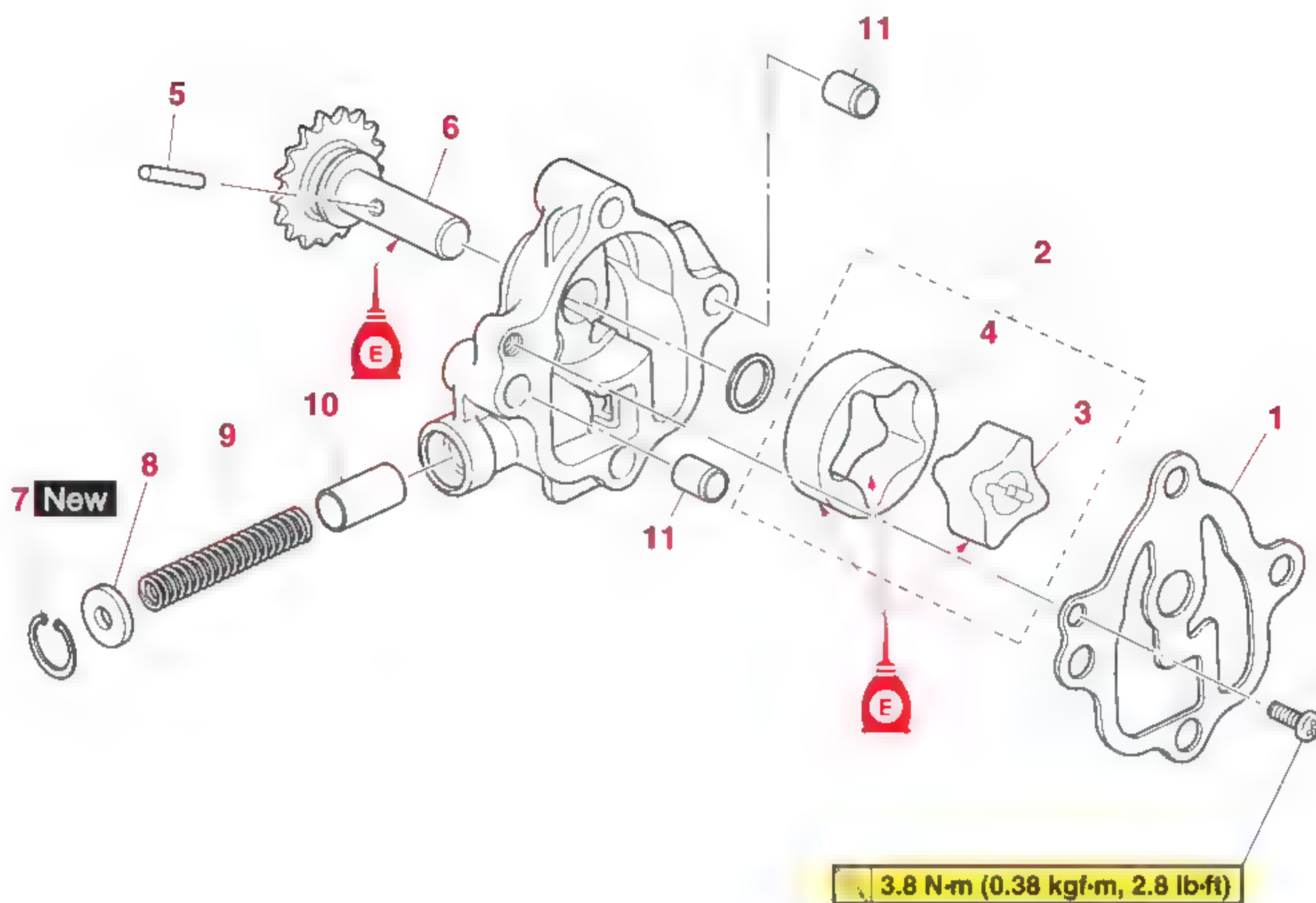
OIL PUMP

Removing the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-28.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25.
	Clutch housing		Refer to "CLUTCH" on page 5-52.
1	Oil pump assembly	1	
2	Holder	1	

Disassembling the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump cover	1	
2	Oil pump rotor assembly	1	
3	Oil pump inner rotor	1	
4	Oil pump outer rotor	1	
5	Pin	1	
6	Oil pump driven sprocket	1	
7	Circlip	1	Hold down the washer when removing the circlip.
8	Washer	1	
9	Spring	1	
10	Relief valve	1	
11	Dowel pin	2	

EAS30336

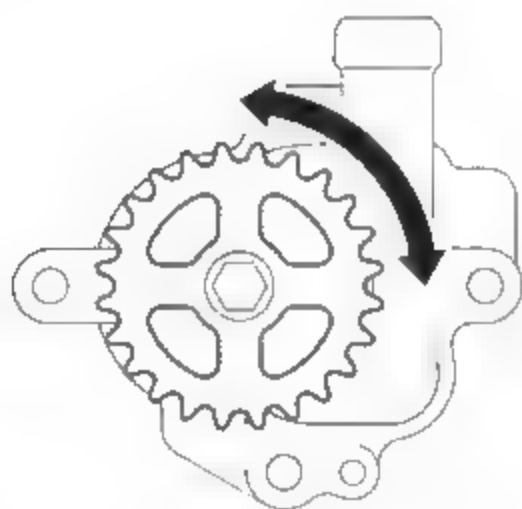
CHECKING THE SPROCKET AND CHAIN

1. Check:
 - Oil pump drive sprocket
Refer to "CHECKING THE CLUTCH HOUSING" on page 5-57.
 - Oil pump driven sprocket
Refer to "CHECKING THE OIL PUMP" on page 5-66.
2. Check:
 - Oil pump drive chain
Damage/stiffness → Replace the oil pump drive chain, oil pump drive sprocket (clutch housing), and oil pump driven sprocket as a set.

EAS30337

CHECKING THE OIL PUMP

1. Check:
 - Oil pump driven sprocket
 - Oil pump housing
Cracks/damage/wear → Replace the oil pump assembly.
2. Check:
 - Oil pump operation
Rough movement → Replace the oil pump assembly.



G088997

EAS30338

CHECKING THE RELIEF VALVE

1. Check:
 - Relief valve
 - Spring
Damage/wear → Replace the oil pump assembly.

EAS30342

ASSEMBLING THE OIL PUMP

1. Lubricate:
 - Inner rotor
 - Outer rotor
(with the recommended lubricant)



Recommended lubricant
Engine oil

2. Lubricate:
 - Oil pump driven sprocket
(with the recommended lubricant)



Recommended lubricant
Engine oil

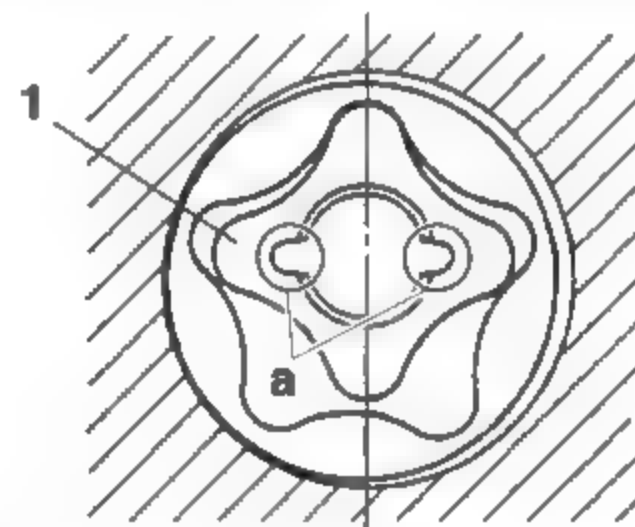
3. Install:
 - Oil pump driven sprocket
 - Pin
 - Outer rotor
 - Inner rotor
 - Oil pump cover
 - Oil pump cover screw



Oil pump cover screw
3.8 N·m (0.38 kgf·m, 2.8 lb·ft)

TIP

Align the pin in the oil pump shaft with the grooves "a" in the inner rotor "1".



4. Check:
 - Oil pump operation
Refer to "CHECKING THE OIL PUMP" on page 5-66.

EAS30343

INSTALLING THE OIL PUMP

1. Install:
 - Oil pump "1"
 - Oil pump bolts "2"

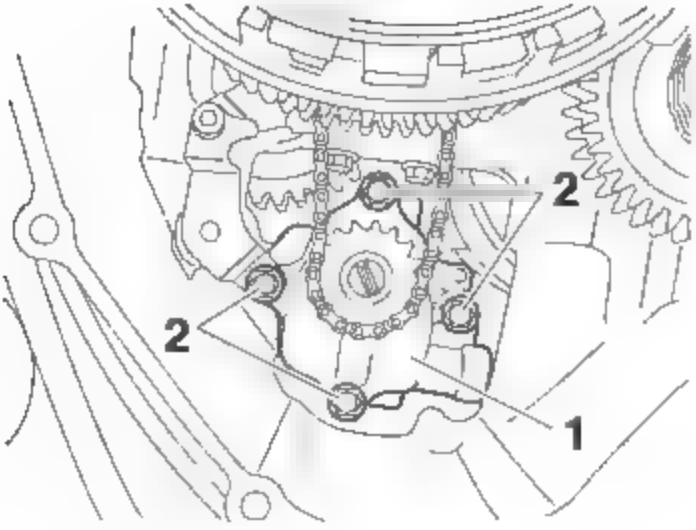


Oil pump bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)

EGA20940

NOTICE

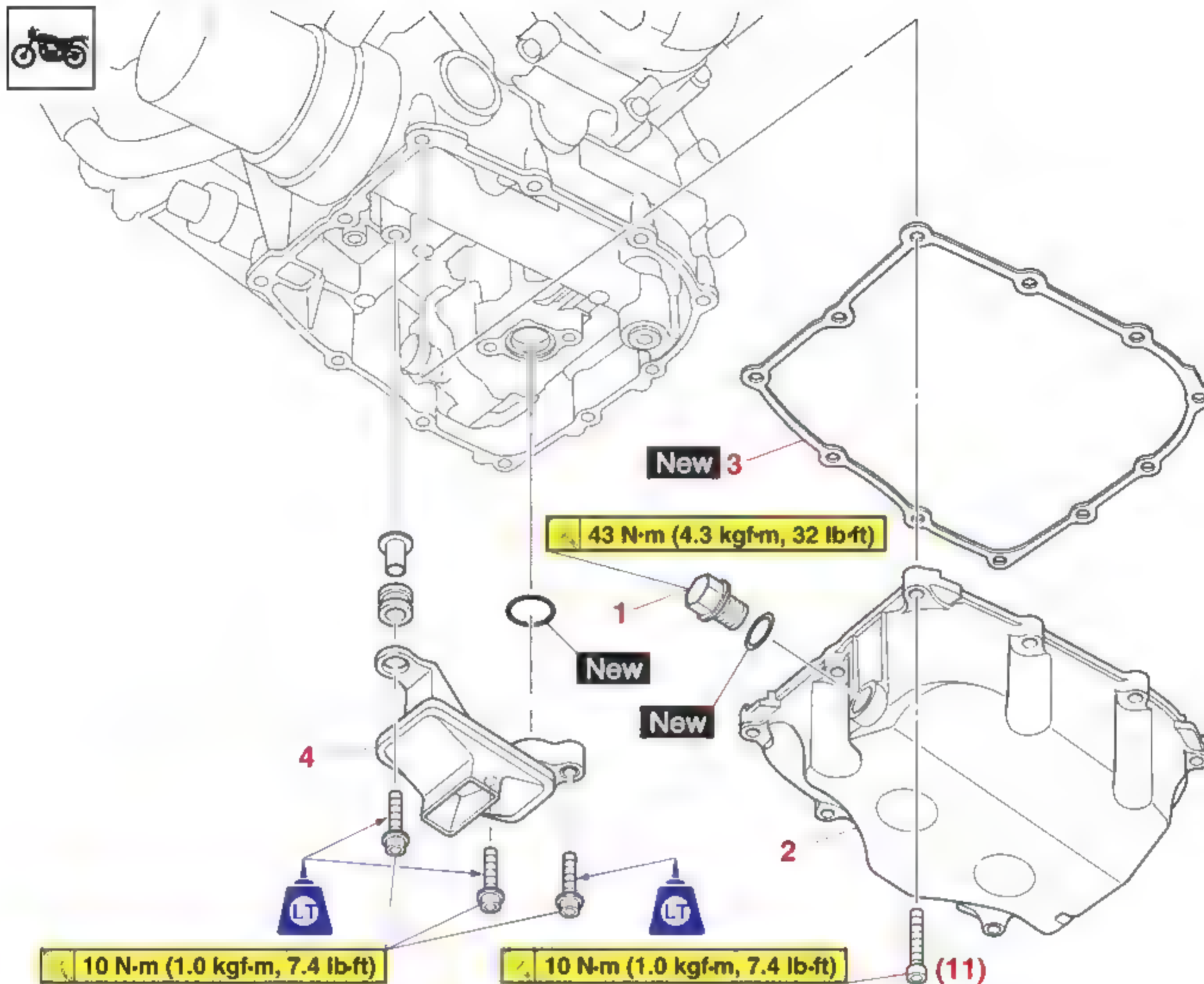
After installing the oil pump drive chain and driven sprocket, make sure the oil pump turns smoothly.



EAS20177

OIL PAN

Removing the oil pan



Order	Job/Parts to remove	Q'ty	Remarks
	Air scoop (right)/Air duct (right)		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25.
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-10.
1	Engine oil drain bolt	1	
2	Oil pan	1	
3	Oil pan gasket	1	
4	Oil strainer	1	

EAS31068

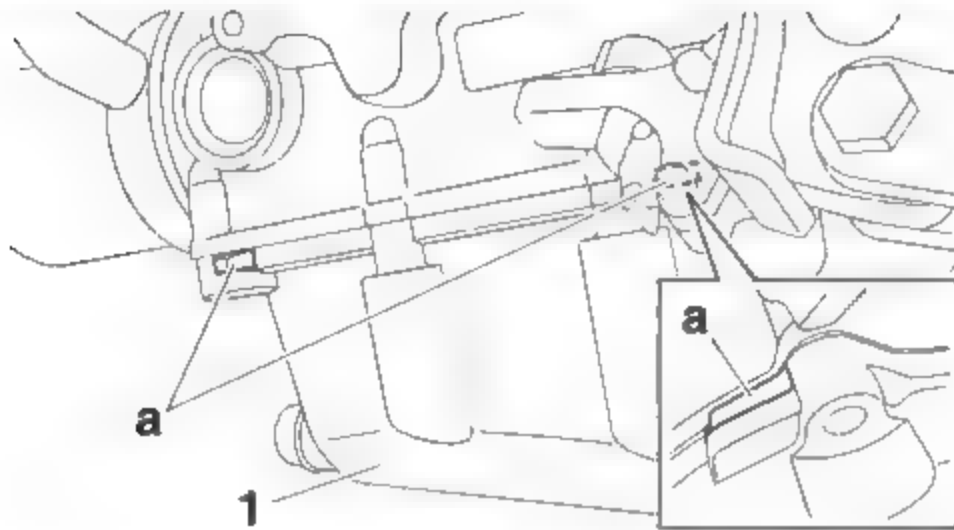
REMOVING THE OIL PAN

1. Remove:

- Oil pan "1"
- Oil pan gasket

TIP

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Insert a flat-head screwdriver into the slots "a" in the oil pan to remove the oil pan.



EAS31069

CHECKING THE OIL STRAINER

1. Check:

- Oil strainer
Damage → Replace.
Contaminants → Clean with solvent.

EAS31070

INSTALLING THE OIL PAN

1. Install:

- Oil pan gasket **New**
- Oil pan



Oil pan bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)

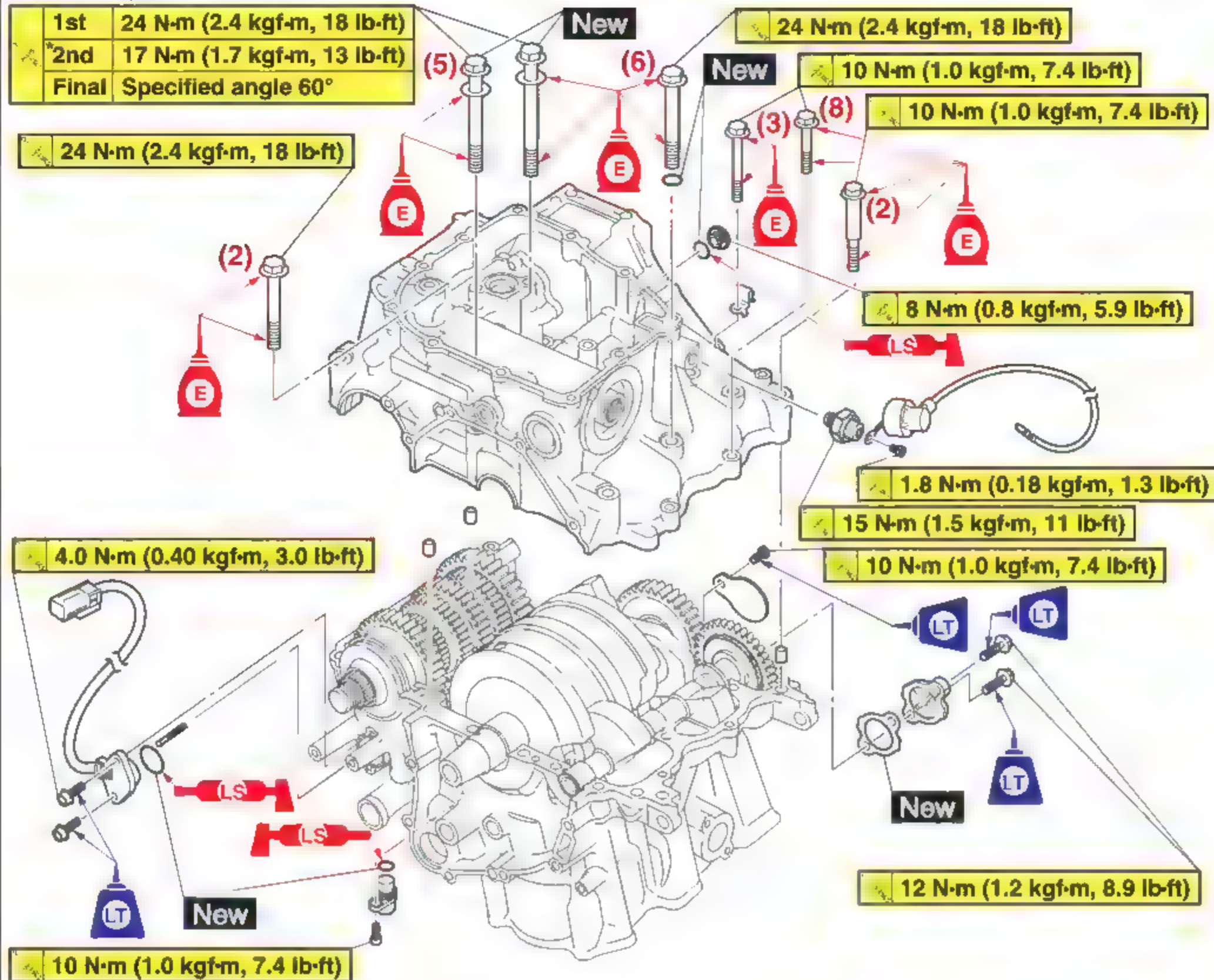
TIP

Tighten the oil pan bolts in stages and in a criss-cross pattern.

CRANKCASE

Separating the crankcase

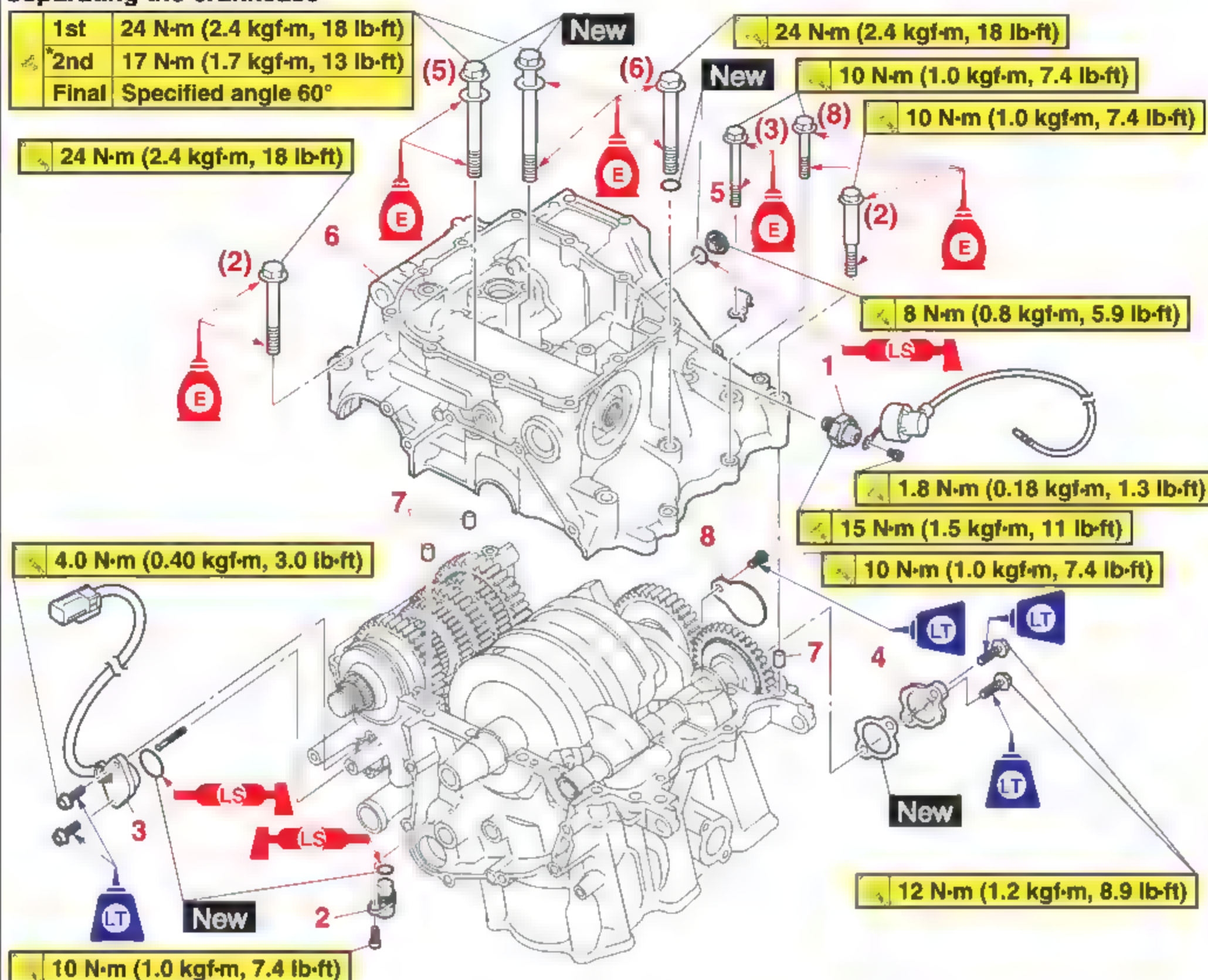
1st	24 N·m (2.4 kgf·m, 18 lb·ft)
*2nd	17 N·m (1.7 kgf·m, 13 lb·ft)
Final	Specified angle 60°



* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-10.
	Cylinder head cover		Refer to "CAMSHAFTS" on page 5-20.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-31.
	Starter clutch		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-43.
	Clutch housing		Refer to "CLUTCH" on page 5-52.
	Oil strainer		Refer to "OIL PAN" on page 5-68.

Separating the crankcase



* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pressure switch	1	
2	Cylinder plug	1	
3	Gear position switch	1	
4	Balancer shaft access cover	1	
5	Main gallery bolt	1	
6	Crankcase	1	
7	Dowel pin	3	
8	Blind plate	1	

EAS30389

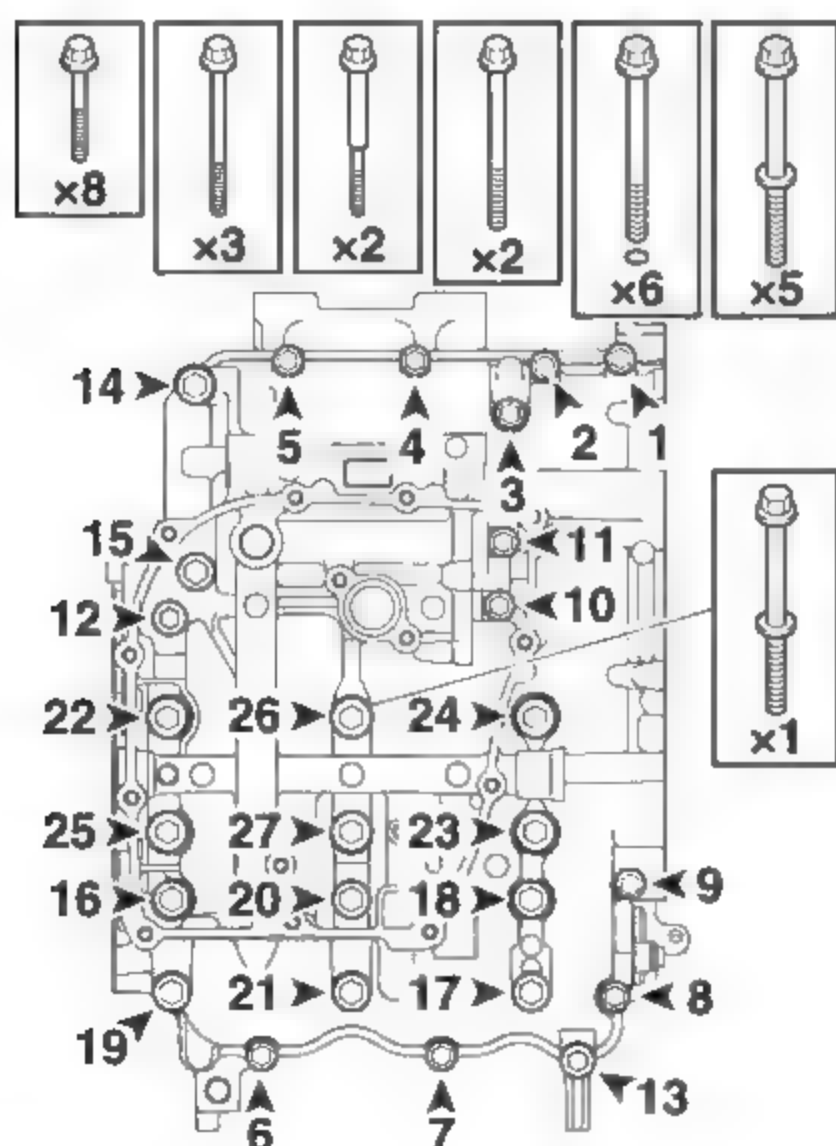
DISASSEMBLING THE CRANKCASE

1. Place the engine upside down.
2. Remove:
 - Crankcase bolt (x27)

TIP

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts "1"–"11" in any loosening sequence.
- Loosen the bolts "12"–"27" in the proper sequence as shown.
- The numbers embossed "1"–"16" on the crankcase indicate the crankcase tightening sequence.

- M6 x 40 mm bolt (x8): "1", "2", "4"–"7", "10", "11"
- M6 x 60 mm bolt (x3): "3", "8", "9"
- M6 x 65 mm bolt (x2): "12", "13"
- M8 x 65 mm bolt (x2): "14", "15"
- M8 x 70 mm bolt (x6) (bolts with O-rings): "16"–"21"
- M9 x 80 mm bolt (x5) (bolts with washers): "22"–"25", "27"
- M9 x 90 mm bolt (x1) (bolts with washer): "26"



3. Remove:
 - Crankcase
 - Dowel pins

ECA13900

NOTICE

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.

EAS30390

CHECKING THE CRANKCASE

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
 - Crankcase
Cracks/damage → Replace.
 - Oil delivery passages
Obstruction → Blow out with compressed air.

EAS30397

ASSEMBLING THE CRANKCASE

1. Lubricate:
 - Crankshaft journal bearing inner surface (with the recommended lubricant)



Recommended lubricant
Engine oil

2. Apply:
 - Sealant (onto the crankcase mating surfaces)

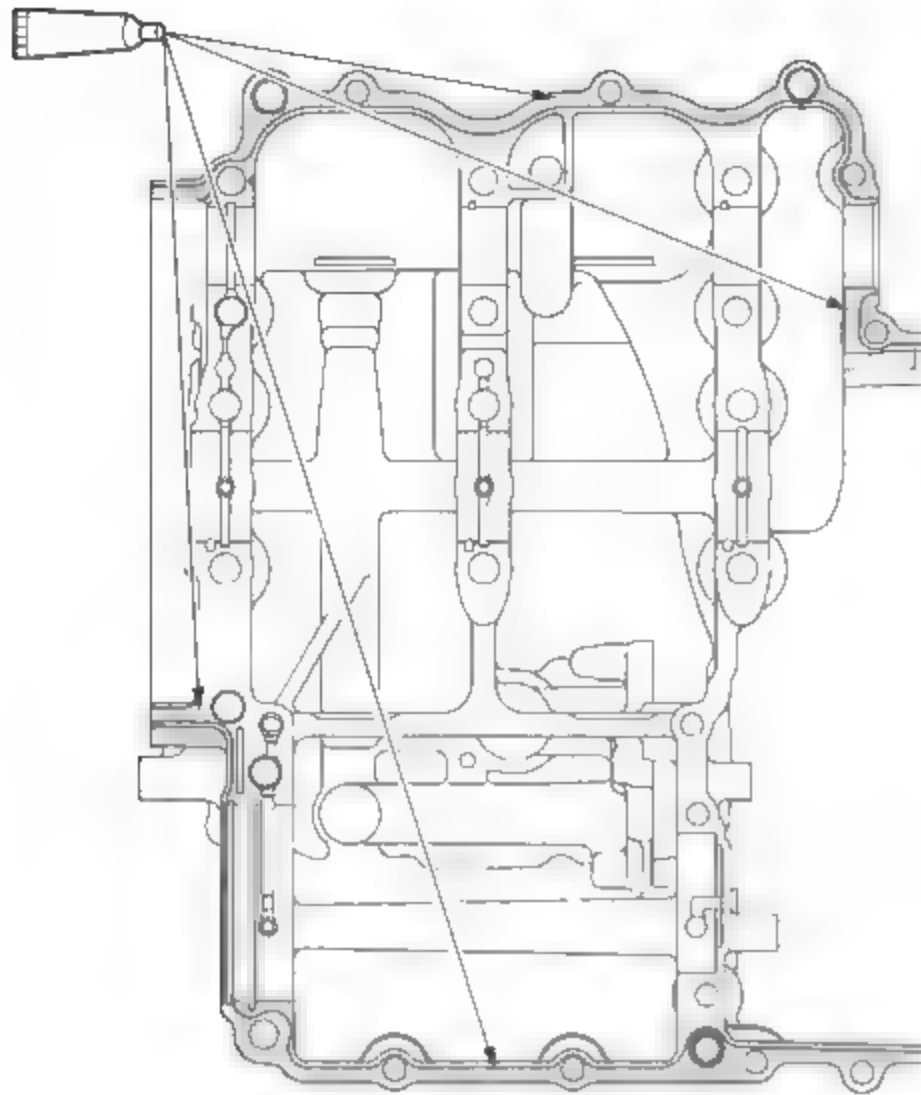


Yamaha bond No. 1215
90890-85505
Three bond No. 1215®

ECA20880

NOTICE

Do not allow any sealant to come into contact with the oil gallery, crankshaft journal bearings, or balancer shaft journal bearings.

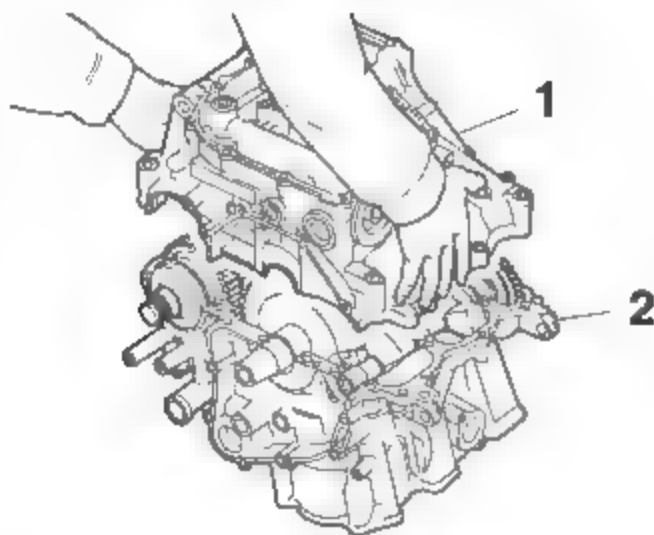


3. Install:
 - Dowel pins
4. Set the shift drum assembly and transmission gears in the neutral position.
5. Install:
 - Crankcase "1" (onto the cylinder "2")

ECA13960

NOTICE

Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.



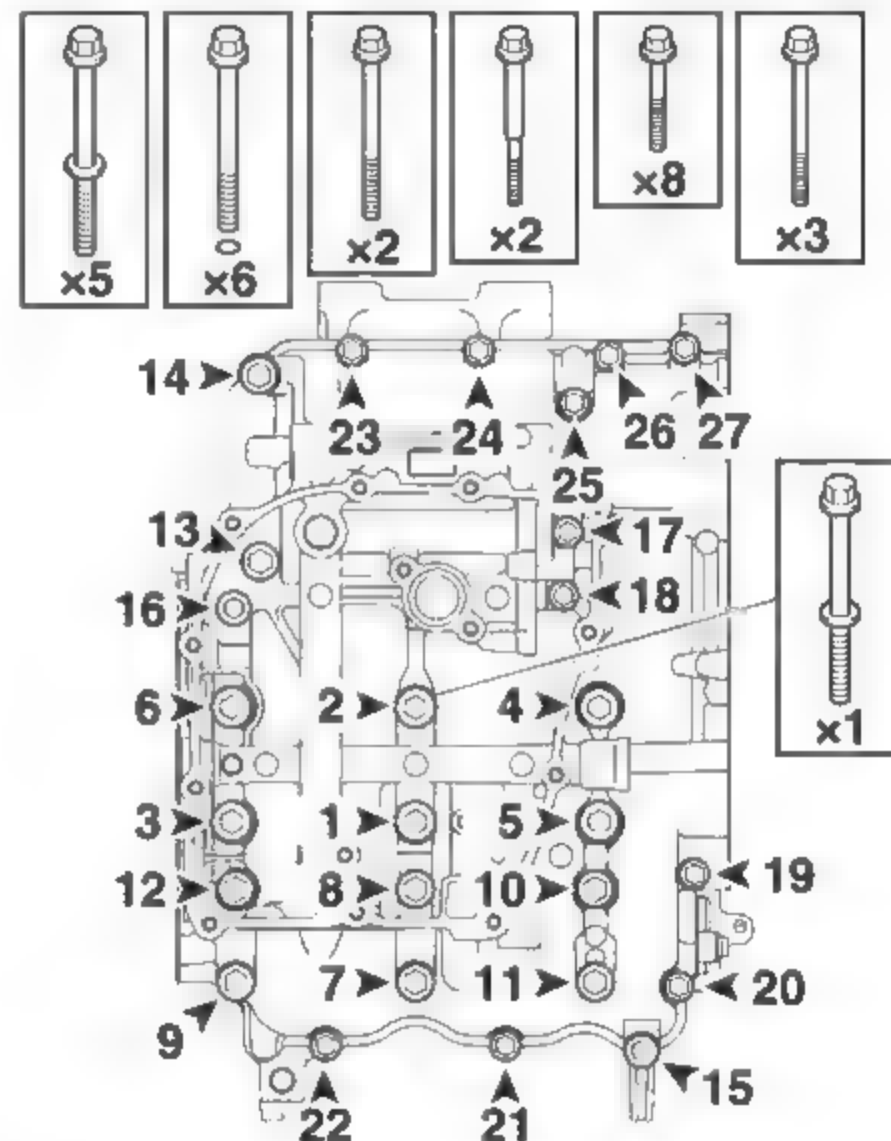
6. Install:
 - Crankcase bolt (x27)

TIP

- Tighten the bolts "1"–"16" in the order of the embossed numbers on the crankcase.
- Lubricate the bolts "1"–"6" threads, mating surfaces and washers with engine oil.
- Lubricate the bolts "7"–"12" threads, mating surfaces and O-rings with engine oil.

- Lubricate the bolts "13"–"27" threads and mating surfaces with engine oil.

- M9 x 80 mm bolt (x5) (bolts with washers): "1", "3"–"6" **New**
- M9 x 90 mm bolt (x1) (bolt with washer): "2" **New**
- M8 x 70 mm bolt (x6) (bolts with new O-rings): "7"–"12"
- M8 x 65 mm bolt (x2): "13", "14"
- M6 x 65 mm bolt (x2): "15", "16"
- M6 x 40 mm bolt (x8): "17", "18", "21"–"24", "26", "27"
- M6 x 60 mm bolt (x3): "19", "20", "25"



7. Tighten:
 - Crankcase bolts "1"–"6"



Crankcase bolts (bolts with washers) "1"–"6"

1st: 24 N·m (2.4 kgf·m, 18 lb·ft)

*2nd: 17 N·m (1.7 kgf·m, 13 lb·ft)

Final: specified angle 60°

* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

EWA16610

WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

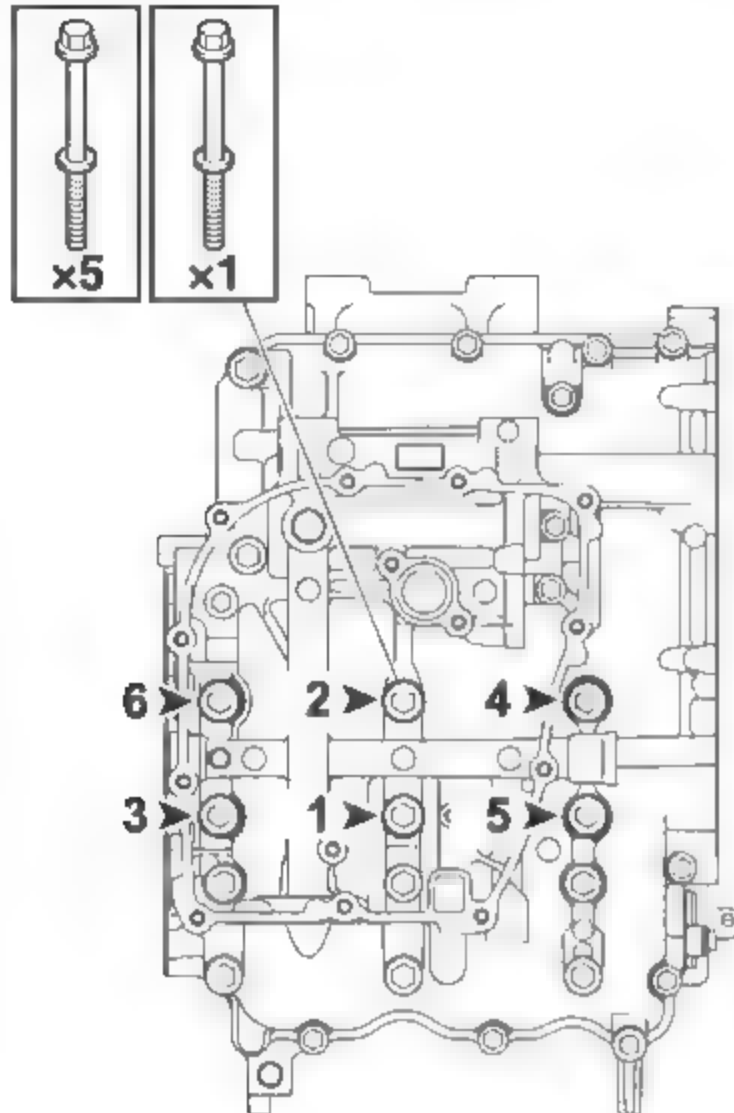
ECA20880

NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.

TIP

Tighten the bolts in the tightening sequence cast on the crankcase.



8. Tighten:

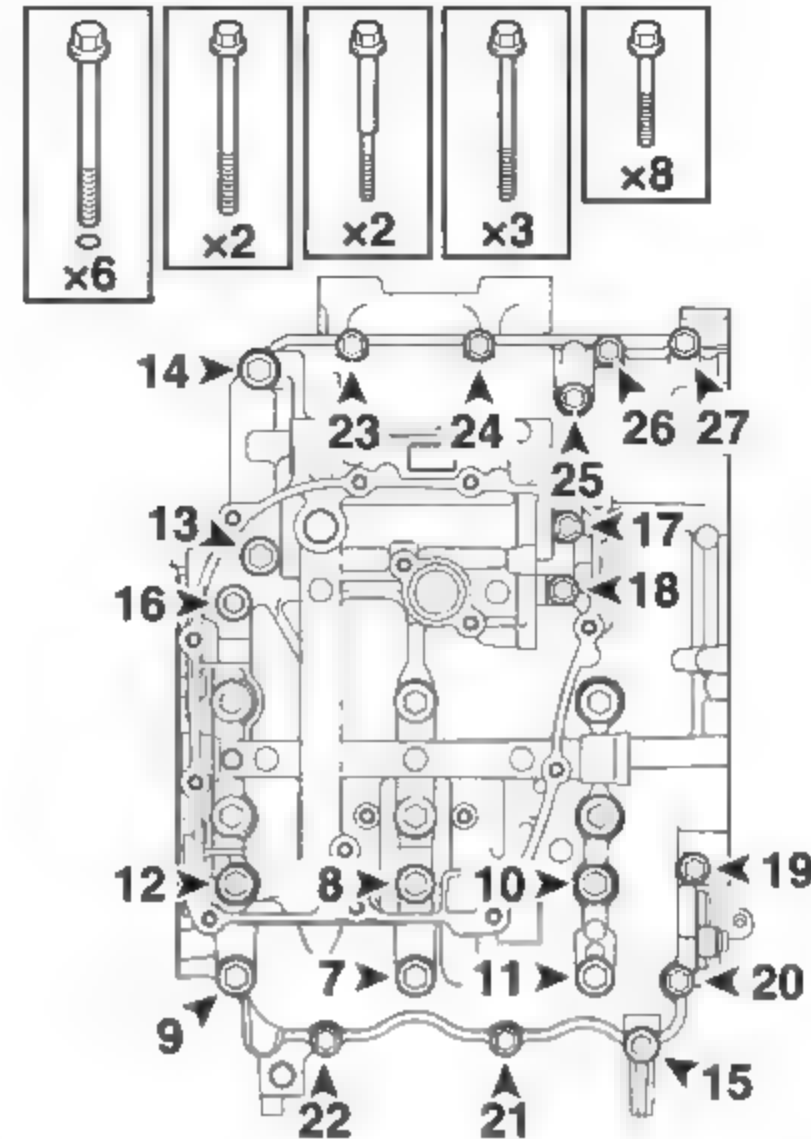
- Crankcase bolts "7"–"27"



Crankcase bolts "7"–"14"
24 N·m (2.4 kgf·m, 18 lb·ft)
Crankcase bolts "15"–"27"
10 N·m (1.0 kgf·m, 7.4 lb·ft)

TIP

- Tighten the bolts "7"–"16" in the tightening sequence cast on the crankcase.
- Tighten the bolts "17"–"27" in any tightening sequence using a crisscross pattern.



EAS31071

INSTALLING THE OIL PRESSURE SWITCH

1. Install:

- Oil pressure switch "1"
- Oil pressure switch lead "2"



Oil pressure switch
15 N·m (1.5 kgf·m, 11 lb·ft)
Oil pressure switch lead bolt
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

2. Apply:

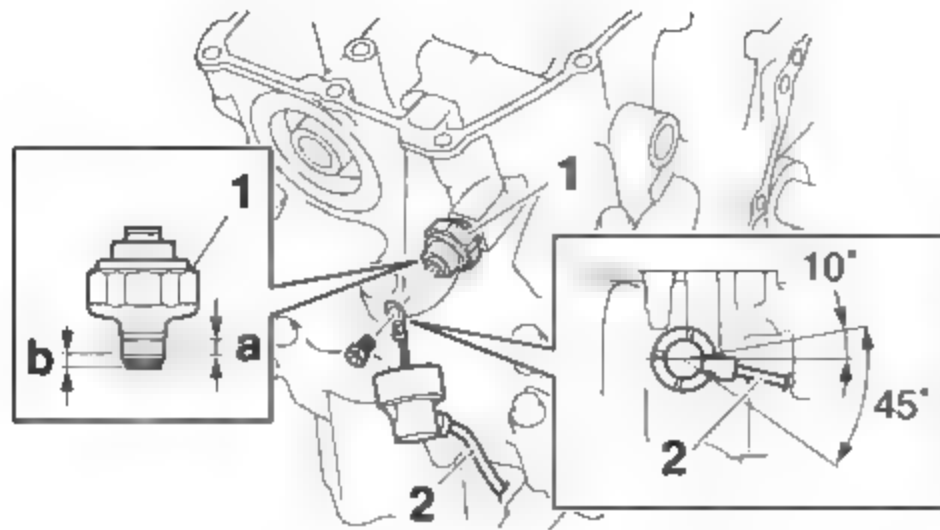
- Sealant
(onto the oil pressure switch threads)



Yamaha bond No. 1215
90890-85505
Three bond No. 1215®

TIP

- Apply Three bond No. 1215® to the threads "a" of the oil pressure switch. However, do not apply Three bond No. 1215® to the portion "b" of the oil pressure switch.
- Install the oil pressure switch lead so that it is routed within the range shown in the illustration.



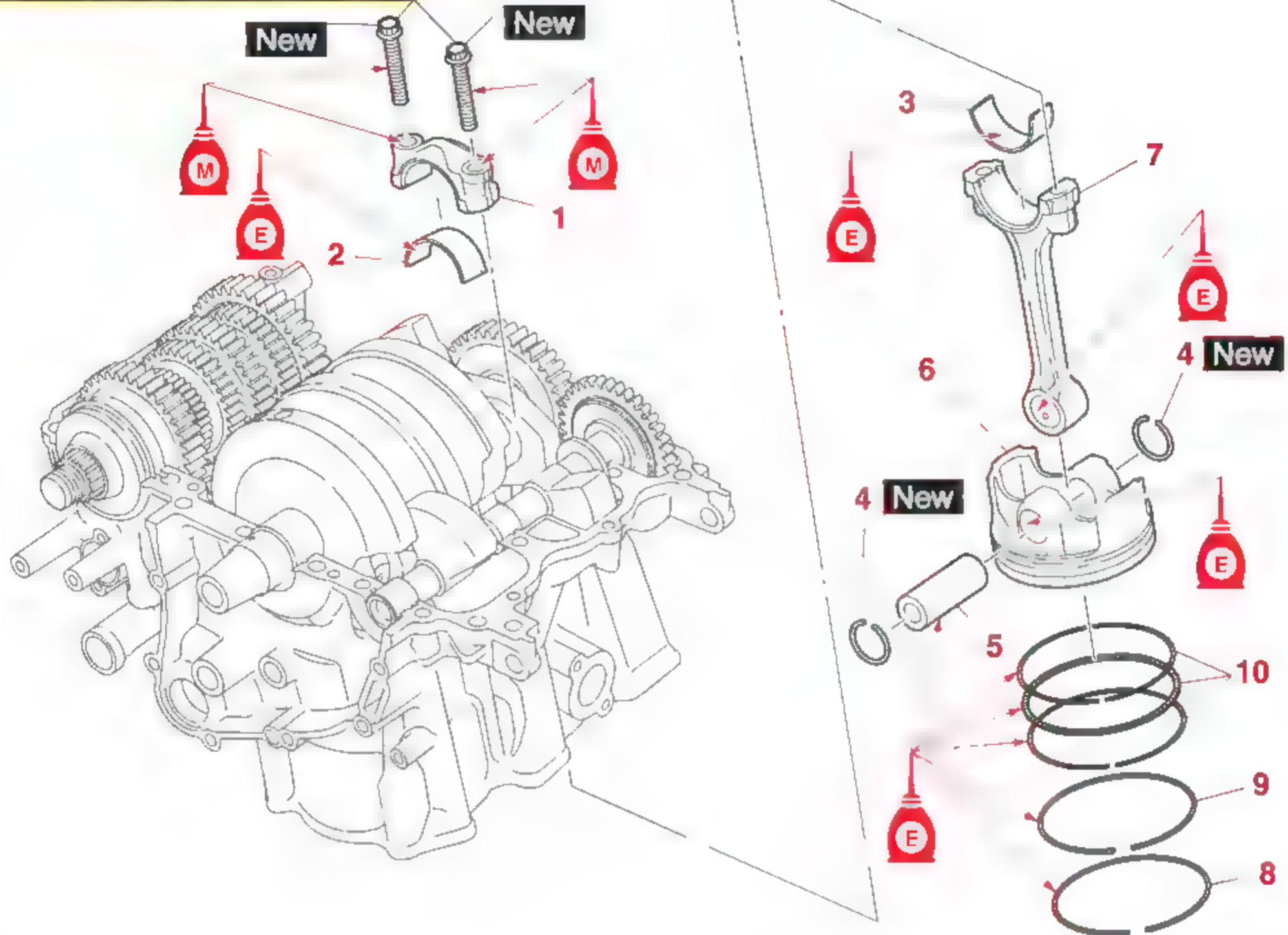
CONNECTING RODS AND PISTONS

EAS20132

CONNECTING RODS AND PISTONS

Removing the connecting rods and pistons

1st	20 N·m (2.0 kgf·m, 15 lb·ft)
2nd	Specified angle 180°



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to all of the connecting rods and pistons.
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-70.
1	Connecting rod cap	1	
2	Big end lower bearing	1	
3	Big end upper bearing	1	
4	Piston pin clip	2	
5	Piston pin	1	
6	Piston	1	
7	Connecting rod	1	
8	Top ring	1	
9	2nd ring	1	
10	Oil ring	1	

CONNECTING RODS AND PISTONS

EAS30746

REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

1. Remove:

- Connecting rod cap
- Connecting rod
- Big end bearings

TIP

- Identify the position of each connecting rod cap so that it can be reinstalled in its original place.
- After removing the connecting rods and connecting rod caps, care should be taken not to damage the mating surfaces of the connecting rods and connecting rod caps.

2. Remove:

- Piston pin clips
- Piston pin "1"
- Piston "2"
- Connecting rod

EGA13810

NOTICE

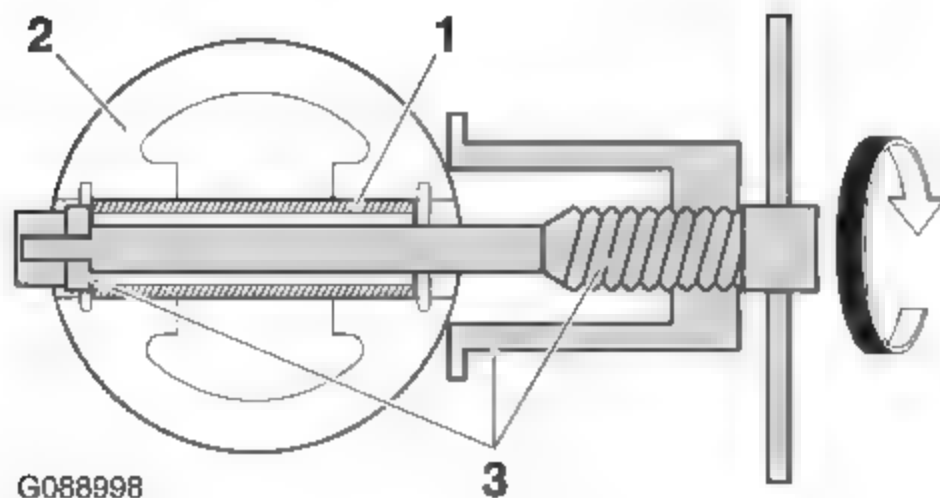
Do not use a hammer to drive the piston pin out.

TIP

- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are debarred and the piston pin is still difficult to remove, remove it with the piston pin puller set "3".



Piston pin puller set
90890-01304
Piston pin puller
YU-01304



G088998

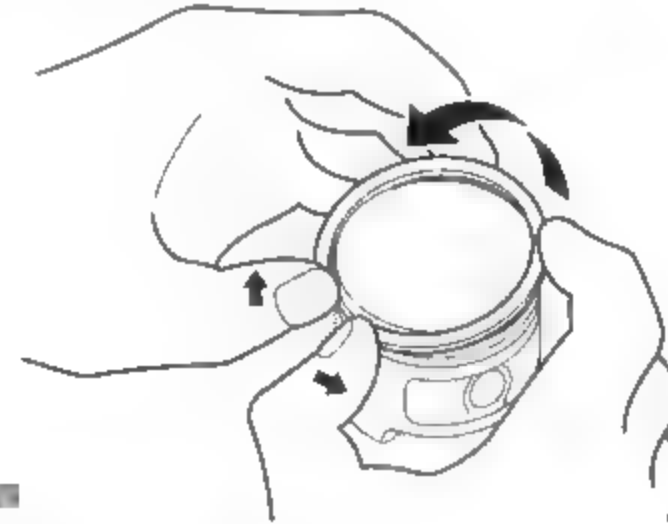
3. Remove:

- Top ring

- 2nd ring
- Oil ring

TIP

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EAS30747

CHECKING THE CYLINDER AND PISTON

The following procedure applies to all of the cylinders and pistons.

1. Check:

- Piston wall
- Cylinder wall

Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.

2. Measure:

- Piston-to-cylinder clearance
 - a. Measure cylinder bore with the cylinder bore gauge.

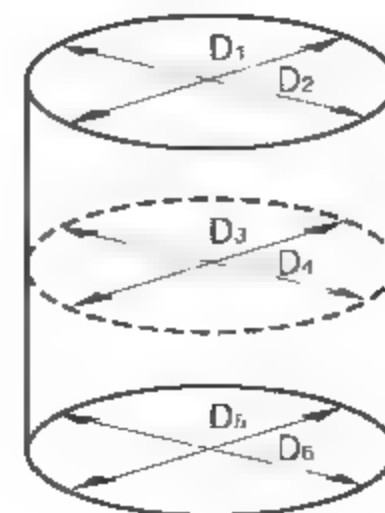
TIP

Measure cylinder bore by taking side-to-side and front-to-back measurements of the cylinder.



Bore
80.000–80.010 mm (3.1496–3.1500 in)
Wear limit
80.060 mm (3.1520 in)

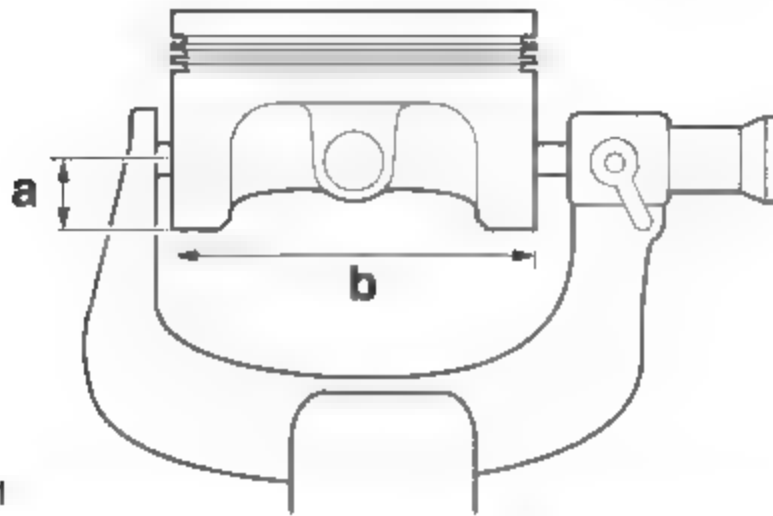
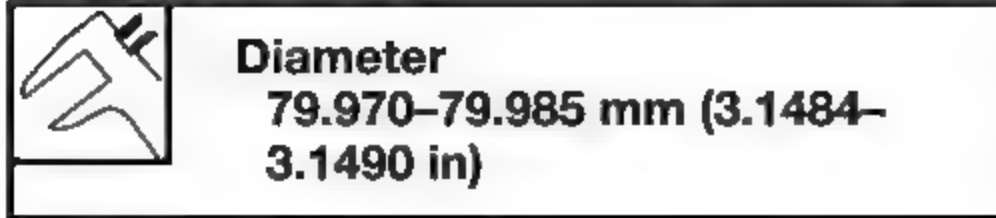
"C" = maximum of D₁, D₂, D₃, D₄, D₅, D₆



G089000

CONNECTING RODS AND PISTONS

- b. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.
- c. Measure piston skirt diameter "b" with the micrometer.



G089001

- a. 8.0 mm (0.31 in) from the bottom edge of the piston
- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =
Cylinder bore "C" – Piston skirt diameter "b"

- f. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.

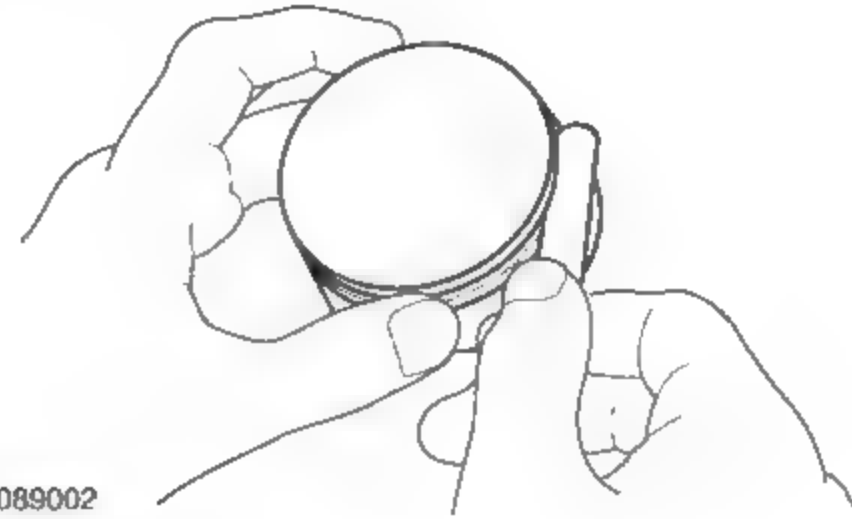
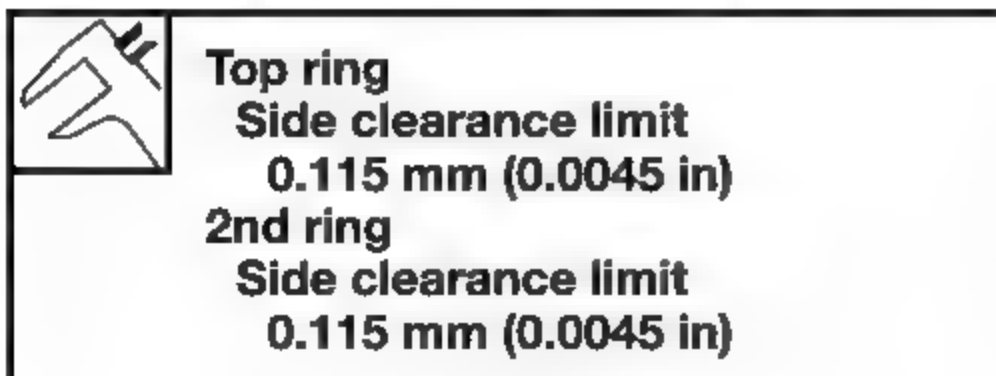
EAS30748

CHECKING THE PISTON RINGS

1. Measure:
 - Piston ring side clearance
Out of specification → Replace the piston and piston rings as a set.

TIP

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.



G089002

2. Install:
 - Piston ring
(into the cylinder)

TIP

Use the piston crown to level the piston ring near the bottom of the cylinder where the cylinder wear is lowest.

3. Measure:

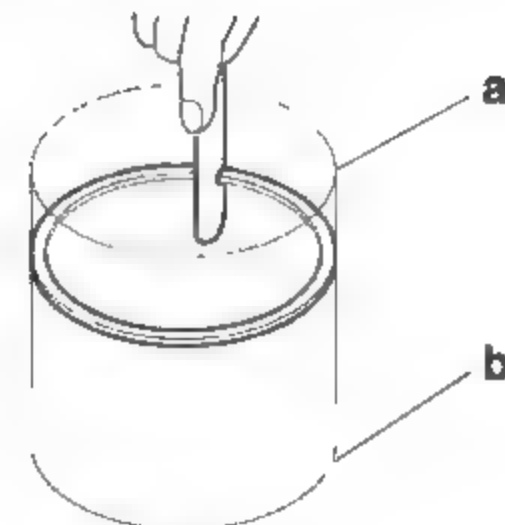
- Piston ring end gap
Out of specification → Replace the piston ring.

TIP

The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.



Top ring
End gap limit
0.50 mm (0.0197 in)
2nd ring
End gap limit
0.80 mm (0.0315 in)



G089003

- a. Bottom of cylinder
- b. Top of cylinder

EAS30749

CHECKING THE PISTON PIN

The following procedure applies to all of the piston pins.

CONNECTING RODS AND PISTONS

1. Check:

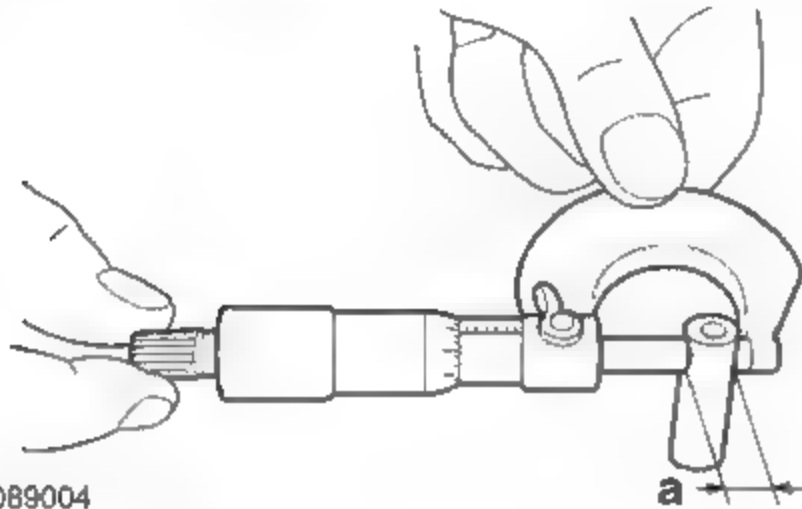
- Piston pin
Blue discoloration/grooves → Replace the piston pin, and then check the lubrication system.

2. Measure:

- Piston pin outside diameter "a"
Out of specification → Replace the piston pin.



Piston pin outside diameter limit
17.970 mm (0.7075 in)



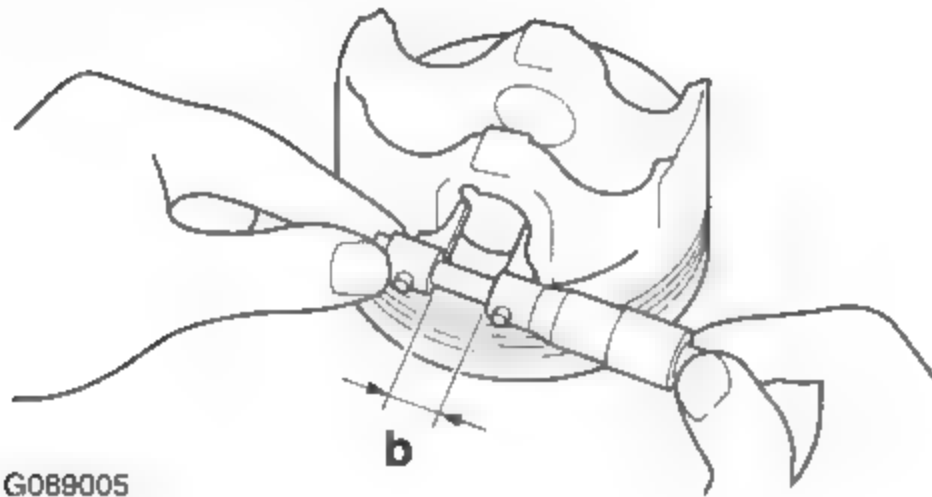
G089004

3. Measure:

- Piston pin bore inside diameter "b"
Out of specification → Replace the piston.



Piston pin bore inside diameter limit
18.045 mm (0.7104 in)



G089005

EAS30750

CHECKING THE CONNECTING RODS

1. Measure:

- Crankshaft-pin-to-big-end-bearing clearance
Out of specification → Replace the big end bearings.



Oil clearance
0.027–0.051 mm (0.0011–0.0020 in)

The following procedure applies to all of the connecting rods.

ECA13930

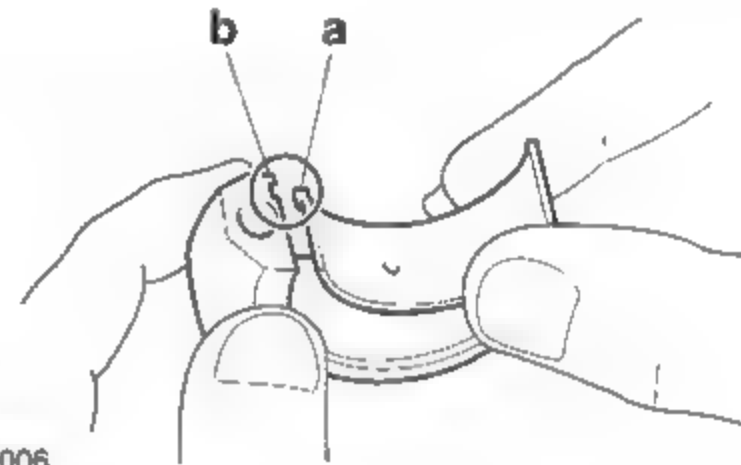
NOTICE

Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

- Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
- Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

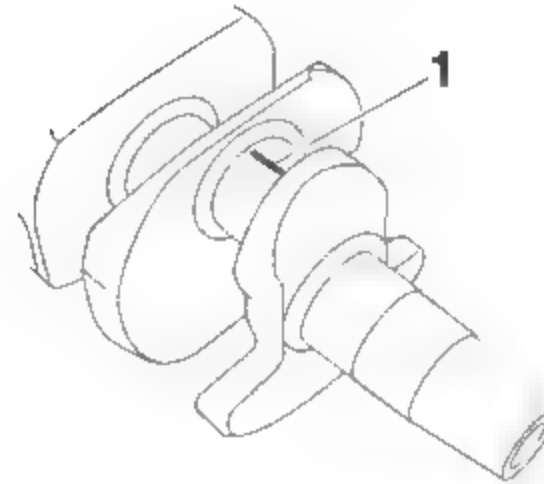
TIP

Align the projections "a" on the big end bearings with the notches "b" in the connecting rod and connecting rod cap.



G089006

- Put a piece of Plastigauge® "1" on the crankshaft pin.



G089008

- Assemble the connecting rod halves.

ECA18390

NOTICE

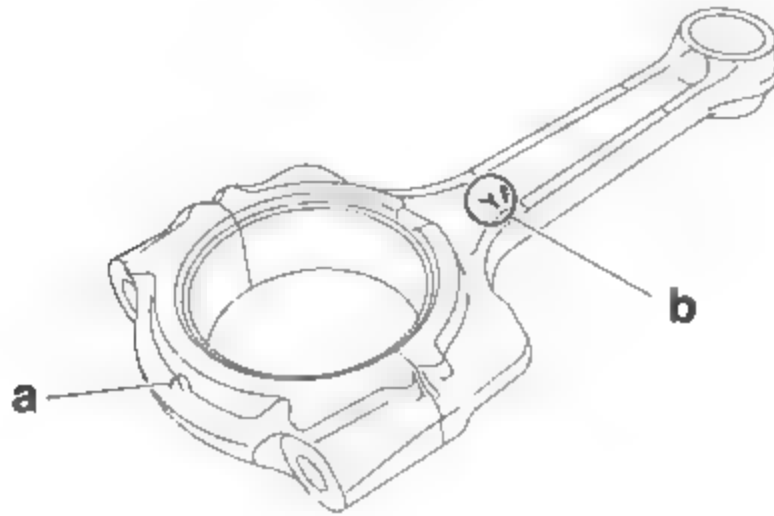
Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

- Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.

CONNECTING RODS AND PISTONS

- Make sure that the projection "a" on the connecting rod cap faces the same direction as the "Y" mark "b" on the connecting rod.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.



TIP

Install by carrying out the following procedures in order to assemble in the most suitable condition.

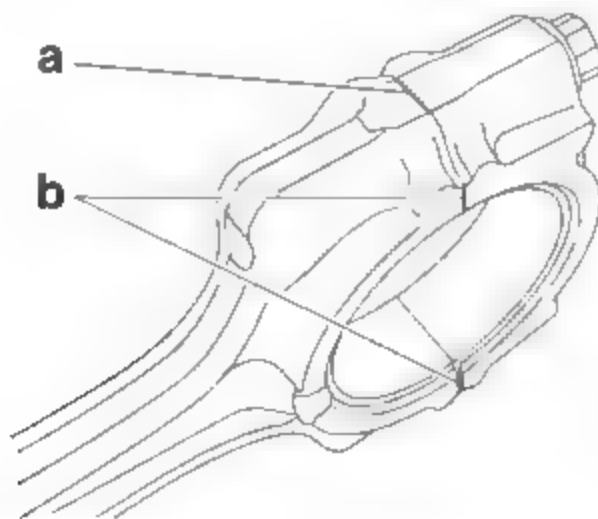
- Tighten the connecting rod bolt while checking that the sections shown "a" and "b" are flush with each other by touching the surface.



Connecting rod bolt
30 N·m (3.0 kgf·m, 22 lb·ft)

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

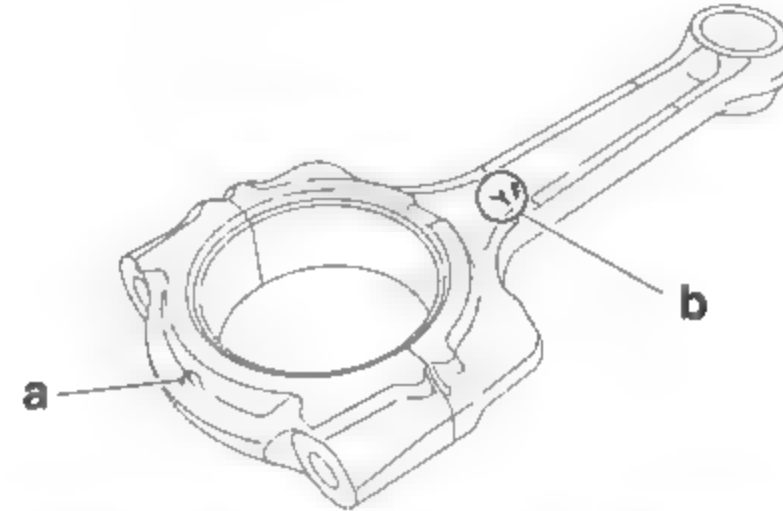


- Side machined face
- Thrusting faces

- Loosen the connecting rod bolts, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

TIP

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Make sure that the projection "a" on the connecting rod cap faces the same direction as the "Y" mark "b" on the connecting rod.
- Make sure the "Y" marks "b" on the connecting rods face towards the left side of the crankshaft.

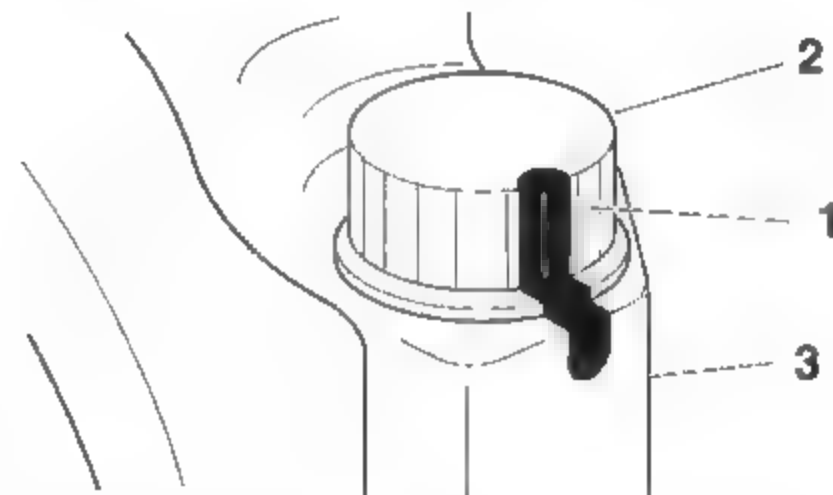


- Tighten the connecting rod bolts with a torque wrench.



Connecting rod bolt (1st)
20 N·m (2.0 kgf·m, 15 lb·ft)

- Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".



- Tighten the connecting rod bolts further to reach the specified angle 175–185°.



Connecting rod bolt (final)
Specified angle 180°

BEARING TIGHTENING

WARNING

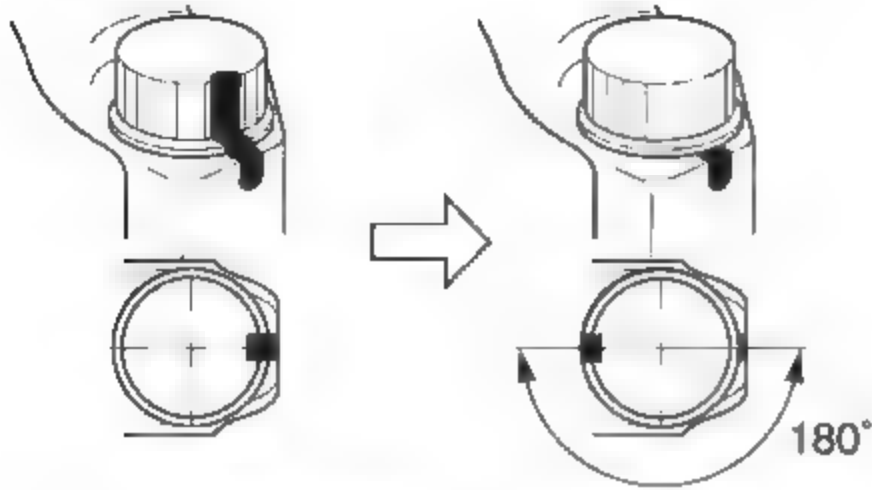
If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

CONNECTING RODS AND PISTONS

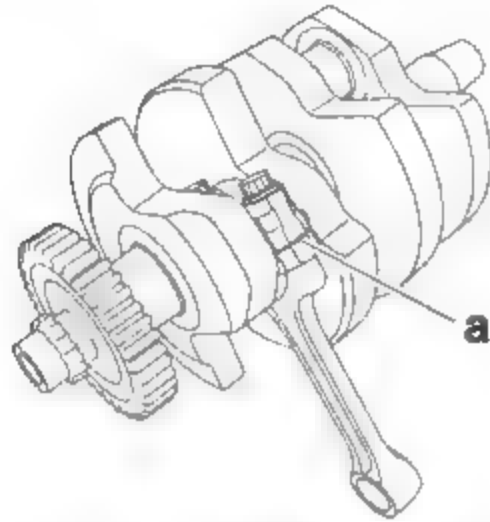
ECA20880

NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.



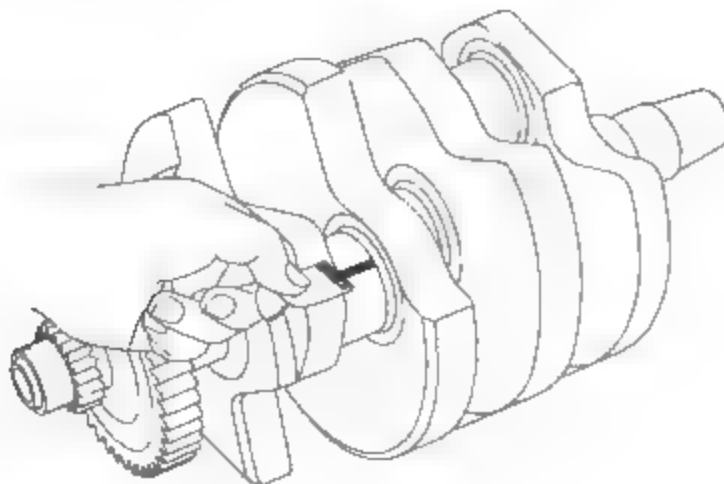
- j. After the installation, check that the section shown "a" is flush with each other by touching the surface.



- k. Remove the connecting rod and big end bearings.
l. Measure the compressed Plastigauge® width on the crankshaft pin. If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



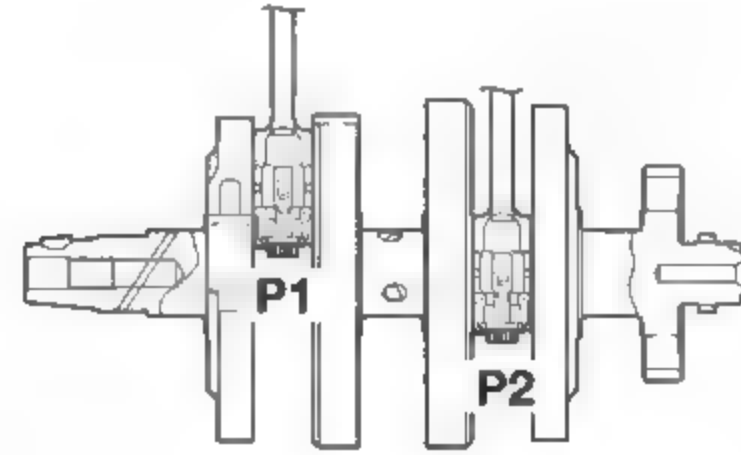
Oil clearance
0.027–0.051 mm (0.0011–0.0020 in)



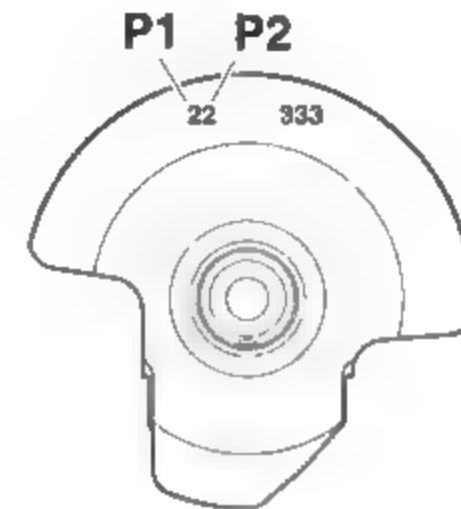
2. Select:
• Big end bearings (P₁–P₂)

TIP

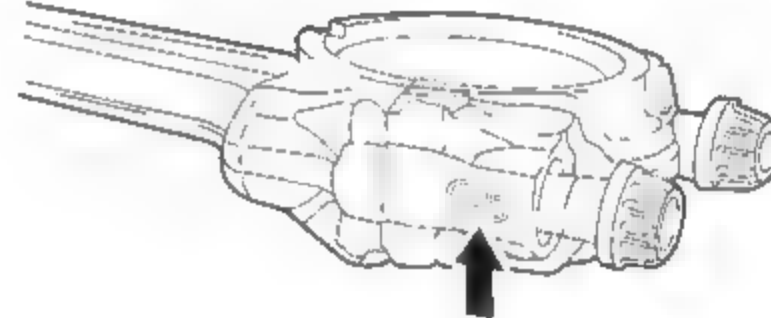
- The numbers "A" stamped into the crankshaft web and the numbers "B" on the connecting rods are used to determine the replacement big end bearings sizes.
- "P₁"–"P₂" refer to the bearings shown in the crankshaft illustration.



A



B



For example, if the connecting rod "P₁" and the crankshaft web "P₁" numbers are "5" and "2" respectively, then the bearing size for "P₁" is:

"P₁" (connecting rod)– "P₁" (crankshaft)
= 5 – 2
= 3 (brown)

CONNECTING RODS AND PISTONS



Bearing color code

Code 1

Blue

Code 2

Black

Code 3

Brown

Code 4

Green

EAS30751

INSTALLING THE CONNECTING ROD AND PISTON

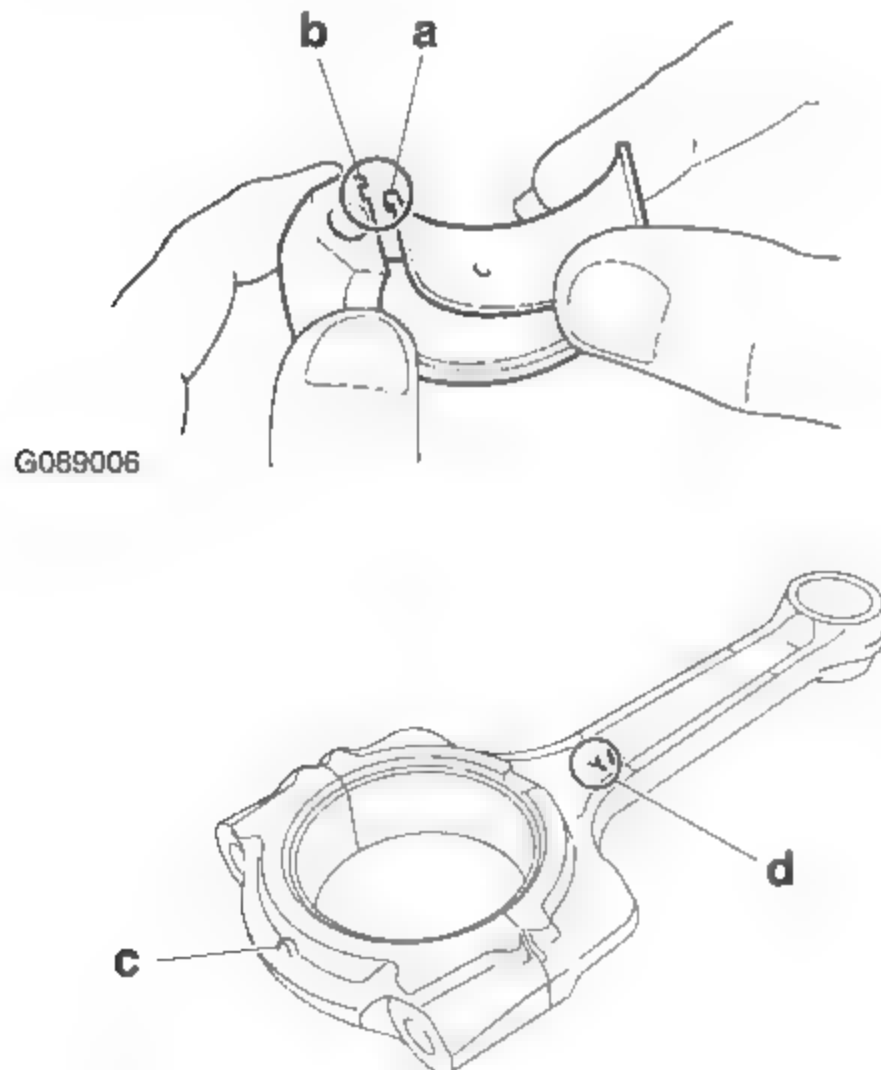
The following procedure applies to all of the connecting rods and pistons.

1. Install:

- Big end bearings
- Connecting rod cap (onto the connecting rod)

TIP

- Be sure to reinstall each big end bearing in its original place.
- Align the projections "a" on the big end bearings with the notches "b" in the connecting rods and connecting rod caps.
- Make sure that the projection "c" on the connecting rod cap faces the same direction as the "Y" mark "d" on the connecting rod.



G089006

2. Tighten:

- Connecting rod bolts **New**

ECA18390

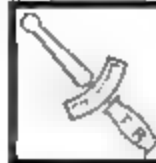
NOTICE

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

Install by carrying out the following procedures in order to assemble in the most suitable condition.

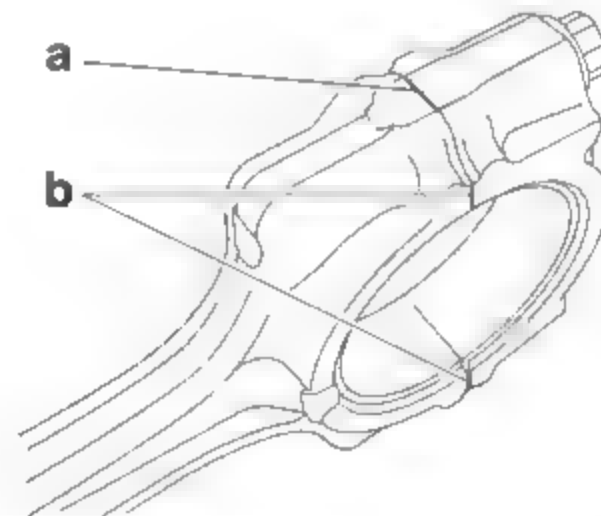
- Replace the connecting rod bolts with new ones.
- Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.
- Tighten the connecting rod bolt while checking that the sections shown "a" and "b" are flush with each other by touching the surface.



Connecting rod bolt
30 N·m (3.0 kgf·m, 22 lb·ft)

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



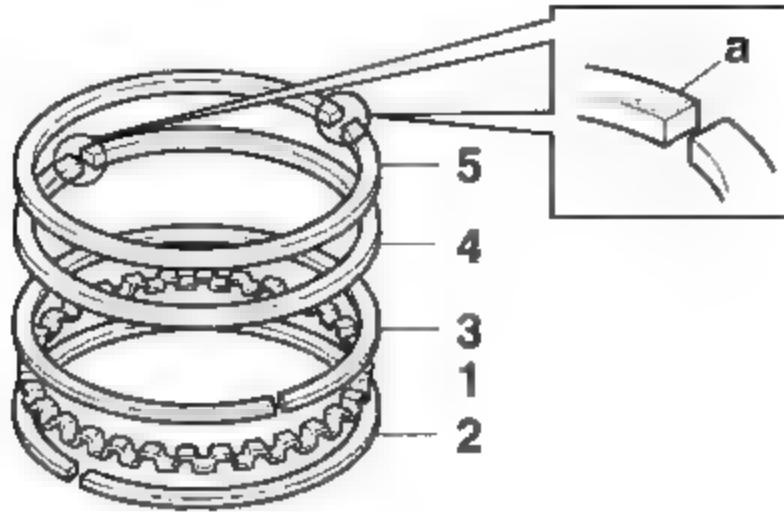
- Side machined face
 - Thrusting faces
- Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.
- ### 3. Install:
- Oil ring expander "1"
 - Lower oil ring rail "2"
 - Upper oil ring rail "3"

CONNECTING RODS AND PISTONS

- 2nd ring "4"
- Top ring "5"

TIP

Be sure to install the piston rings so that the manufacturer's marks "a" face up.

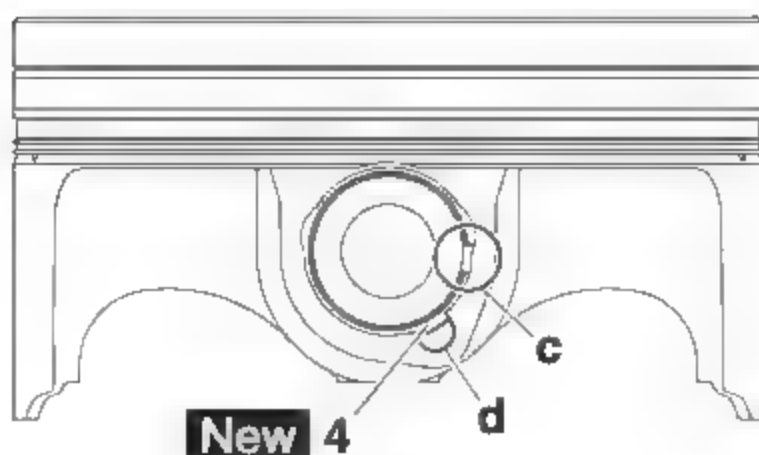
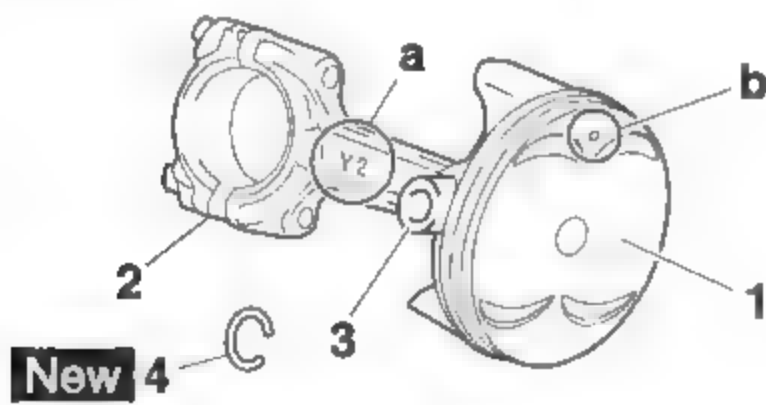


4. Install:

- Piston "1"
- (onto the respective connecting rod "2")
- Piston pin "3"
- Piston pin clips "4" **New**

TIP

- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark "a" on the connecting rod faces left when the punch mark "b" on the piston is pointing up as shown.
- When installing a piston pin clip, make sure that the clip ends "c" are positioned away from the cutout "d" in the piston as shown in the illustration.
- Reinstall each piston into its original cylinder.



5. Lubricate:

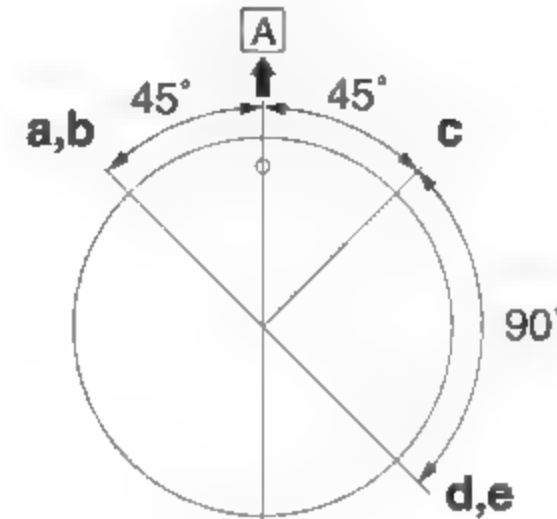
- Piston
- Piston rings
- Cylinder
- (with the recommended lubricant)



Recommended lubricant
Engine oil

6. Offset:

- Piston ring end gaps



- a. 2nd ring
- b. Lower oil ring rail
- c. Upper oil ring rail
- d. Top ring
- e. Oil ring expander
- A. Exhaust side

7. Lubricate:

- Crankshaft pin
- Connecting rod big end bearing inner surface
- (with the recommended lubricant)



Recommended lubricant
Engine oil

8. Install:

- Connecting rod assemblies "1"
- (into the cylinder and onto the crankshaft pin)
- Connecting rod caps
- (onto the connecting rod)

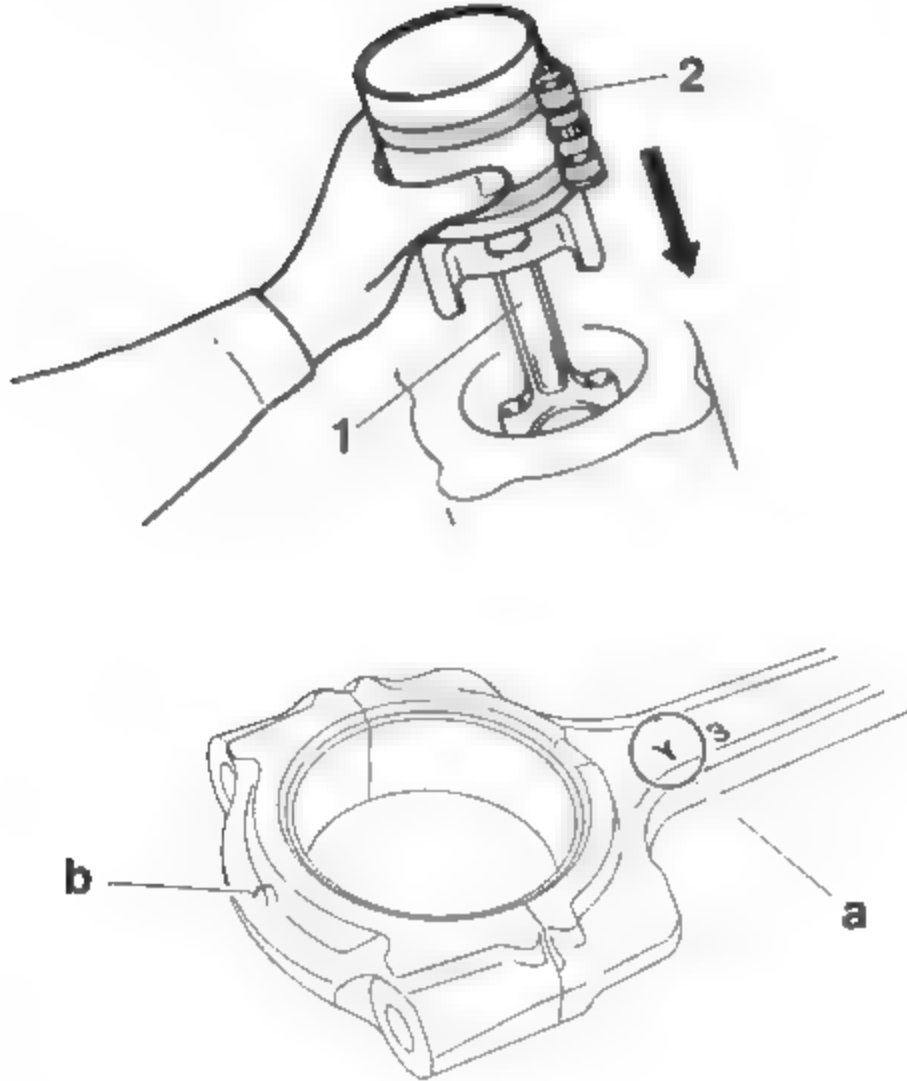
TIP

- While compressing the piston ring with piston ring compressor "2", install the connecting rod assembly into the cylinder with the other hand.
- Make sure the "Y" marks "a" on the connecting rods face towards the left side of the crankshaft.
- Make sure that the projection "b" on the connecting rod cap faces the same direction as the "Y" mark "a" on the connecting rod.
- Apply Molybdenum disulfide oil to the threads and seats of the connecting rod bolt.

CONNECTING RODS AND PISTONS



Piston ring compressor
90890-05158
Piston ring compressor
YM-08037



9. Tighten:
• Connecting rod bolts

TIP

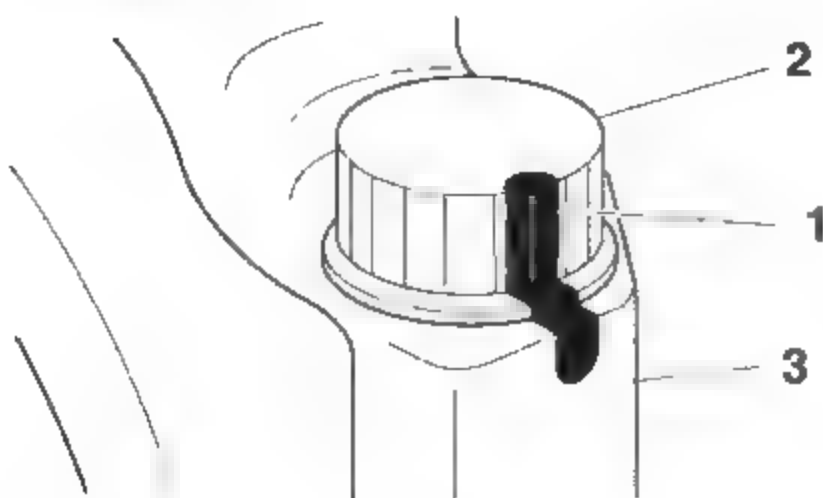
Tighten the connecting rod bolts using the following procedure.

- a. Tighten the connecting rod bolts with a torque wrench.



Connecting rod bolt (1st)
20 N·m (2.0 kgf·m, 15 lb·ft)

- b. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".



- c. Tighten the connecting rod bolts further to reach the specified angle 175–185°.



Connecting rod bolt (final)
Specified angle 180°

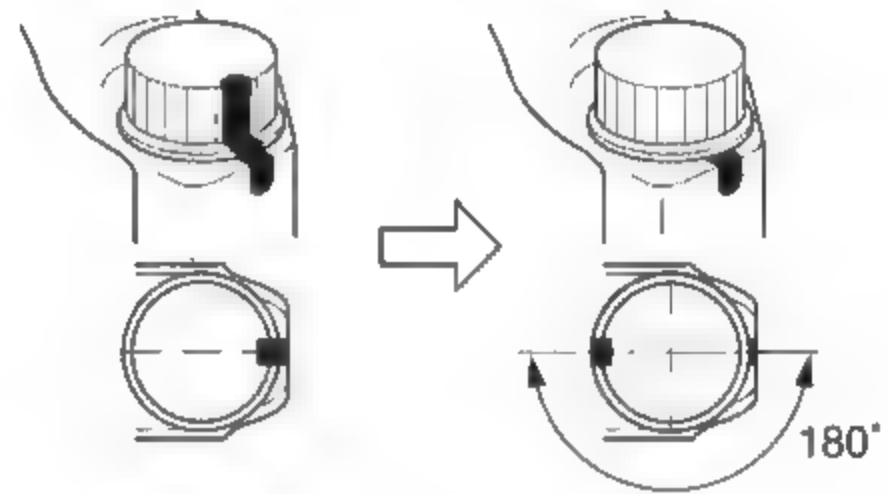
EWA10610

WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.

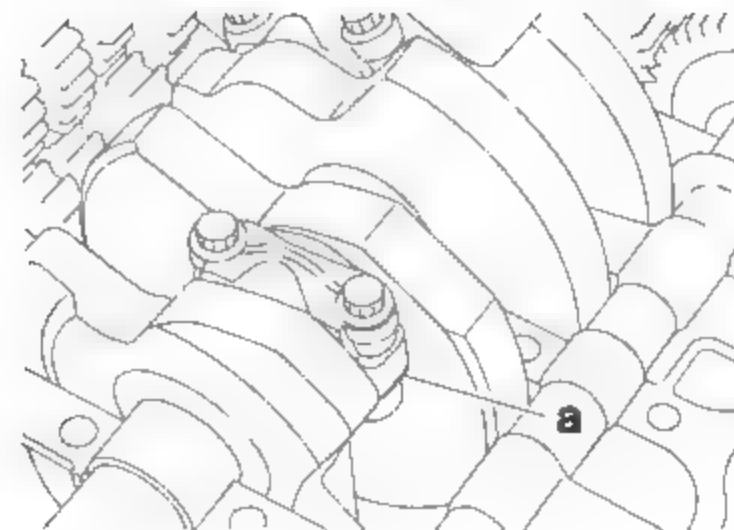


- d. After the installation, check that the section shown "a" is flush with each other by touching the surface.

EWA17120

WARNING

If the connecting rod and cap are not flush with each other, remove the connecting rod bolts and big end bearing and restart from step (1). In this case, make sure to replace the connecting rod bolts.

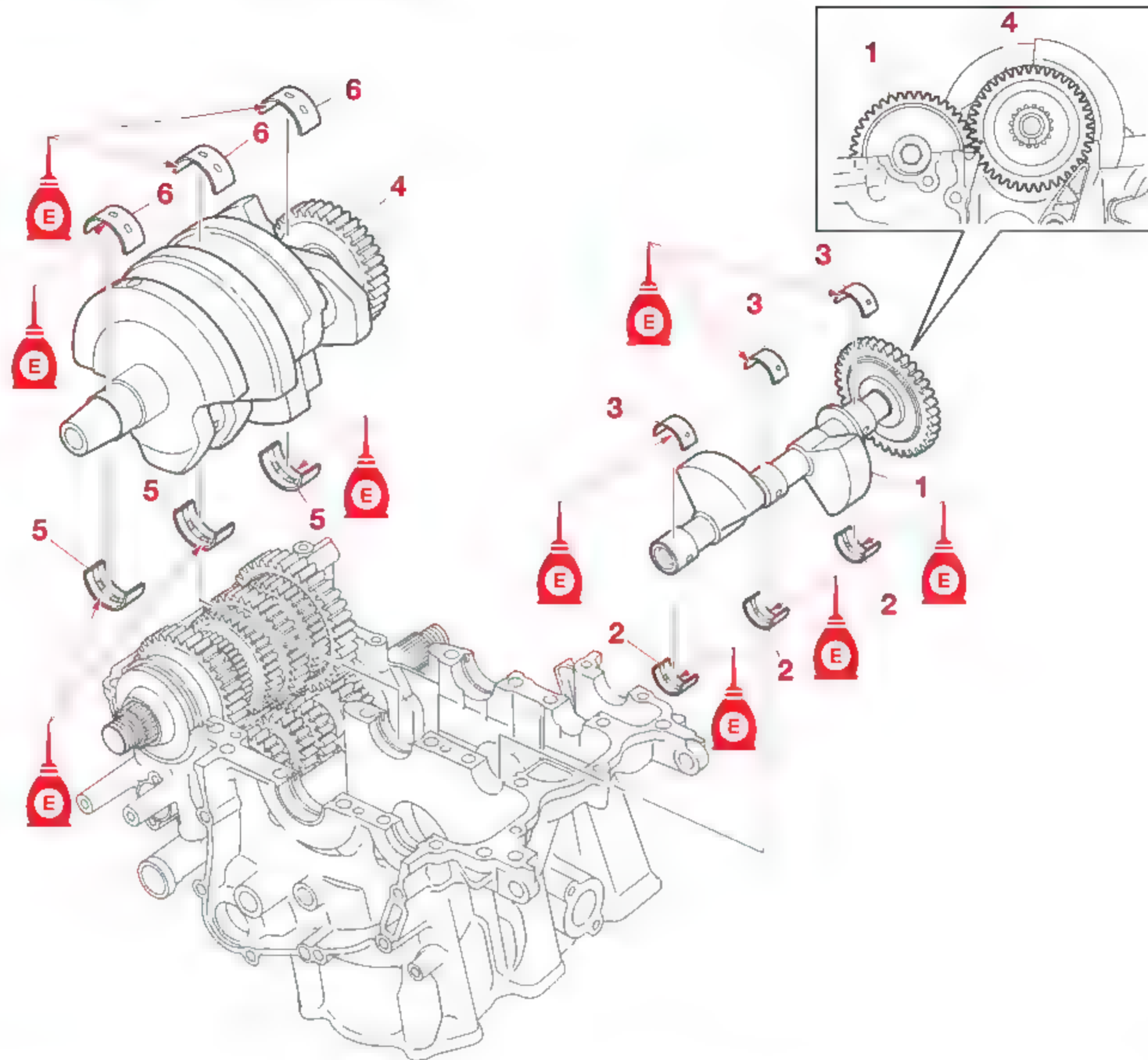


CRANKSHAFT AND BALANCER SHAFT

EAS20178

CRANKSHAFT AND BALANCER SHAFT

Removing the crankshaft and balancer shaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-70.
	Connecting rod		Refer to "CONNECTING RODS AND PISTONS" on page 5-76.
1	Balancer shaft assembly	1	
2	Balancer shaft journal lower bearing	3	
3	Balancer shaft journal upper bearing	3	
4	Crankshaft assembly	1	
5	Crankshaft journal lower bearing	3	
6	Crankshaft journal upper bearing	3	

CRANKSHAFT AND BALANCER SHAFT

EAS31072

REMOVING THE BALANCER SHAFT JOURNAL BEARINGS

1. Remove:

- Balancer shaft journal lower bearings (from the crankcase)
- Balancer shaft journal upper bearings (from the cylinder)

TIP

Identify the position of each balancer shaft journal bearing so that it can be reinstalled in its original place.

EAS31074

REMOVING THE CRANKSHAFT JOURNAL BEARINGS

1. Remove:

- Crankshaft journal lower bearings (from the crankcase)
- Crankshaft journal upper bearings (from the cylinder)

TIP

Identify the position of each crankshaft journal bearing so that it can be reinstalled in its original place.

EAS31142

CHECKING THE BALANCER SHAFT ASSEMBLY

1. Check:

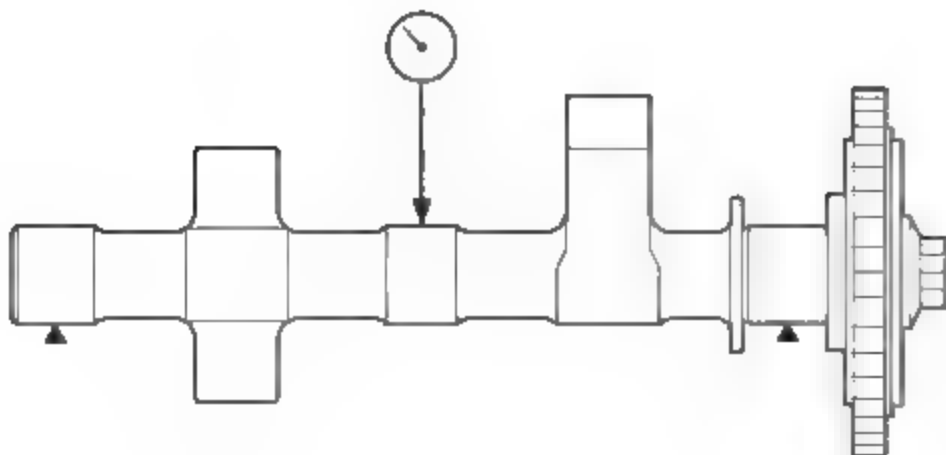
- Balancer driven gear
Damage/wear → Replace the balancer drive gear and balancer shaft assembly as a set.
Excessive noise during operation → Replace the balancer drive gear and balancer shaft assembly as a set.

2. Measure:

- Balancer shaft runout
Out of specification → Replace the balancer shaft assembly.



Balancer shaft runout limit
0.030 mm (0.0012 in)



3. Check:

- Balancer shaft assembly
Cracks/damage/wear → Replace the balancer shaft assembly and journal bearings.
Dirt → Clean.
- Bearings
Damage/wear → Replace.

4. Measure:

- Balancer shaft-journal-to-balancer shaft-journal-bearing clearance
Out of specification → Replace the balancer shaft journal bearings.



Balancer shaft journal to balancer shaft bearing clearance
0.020–0.054 mm (0.0008–0.0021 in)

ECA18400

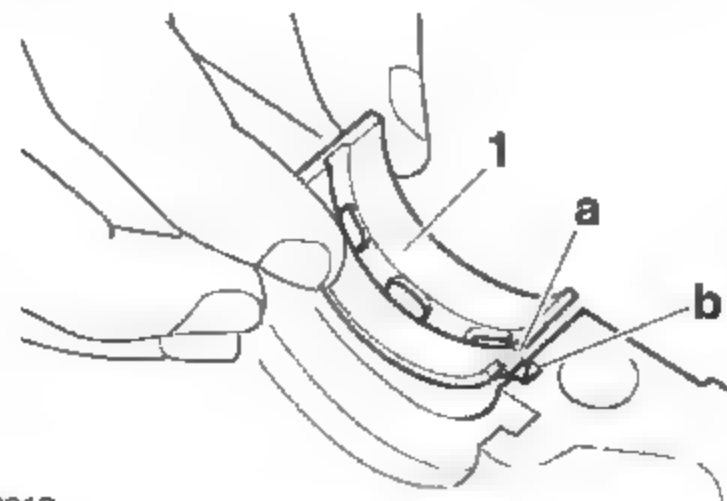
NOTICE

Do not interchange the balancer shaft journal bearings. To obtain the correct balancer shaft-journal-to-balancer shaft-journal-bearing clearance and prevent engine damage, the balancer shaft journal bearings must be installed in their original positions.

- a. Clean the balancer shaft journal bearings, balancer shaft journals, and bearing portions of the crankcase and cylinder.
- b. Install the balancer shaft journal upper bearings "1" and the balancer shaft assembly into the cylinder.

TIP

Align the projections "a" on the balancer shaft journal upper bearings with the notches "b" in the cylinder.



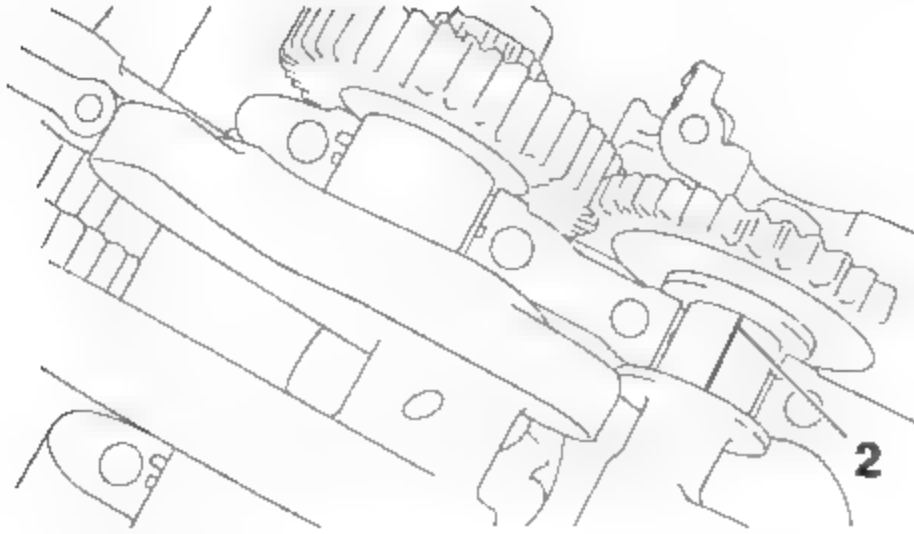
G089019

- c. Put a piece of Plastigauge® "2" on each balancer shaft journal.

TIP

Do not put the Plastigauge® over the oil hole in the balancer shaft journal.

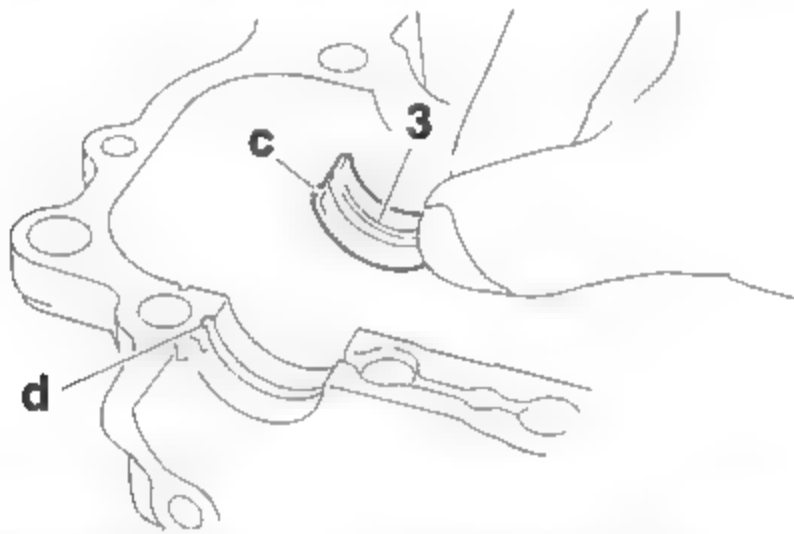
CRANKSHAFT AND BALANCER SHAFT



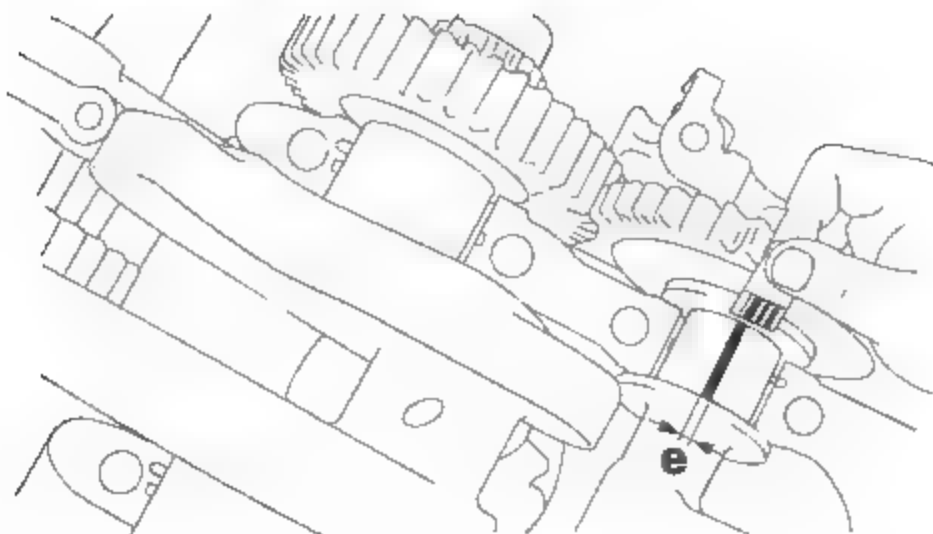
- d. Install the balancer shaft journal lower bearings "3" into the crankcase and assemble the crankcase and cylinder.

TIP

- Align the projections "c" of the balancer shaft journal lower bearings with the notches "d" in the crankcase.
- Do not move the balancer shaft until the clearance measurement has been completed.



- e. Tighten the bolts to specification in the tightening sequence cast on the crankcase.
Refer to "CRANKCASE" on page 5-70.
- f. Remove the crankcase and the balancer shaft journal lower bearings.
- g. Measure the compressed Plastigauge® width "e" on each balancer shaft journal. If the balancer shaft-journal-to-balancer shaft-journal-bearing clearance is out of specification, select replacement balancer shaft journal bearings.

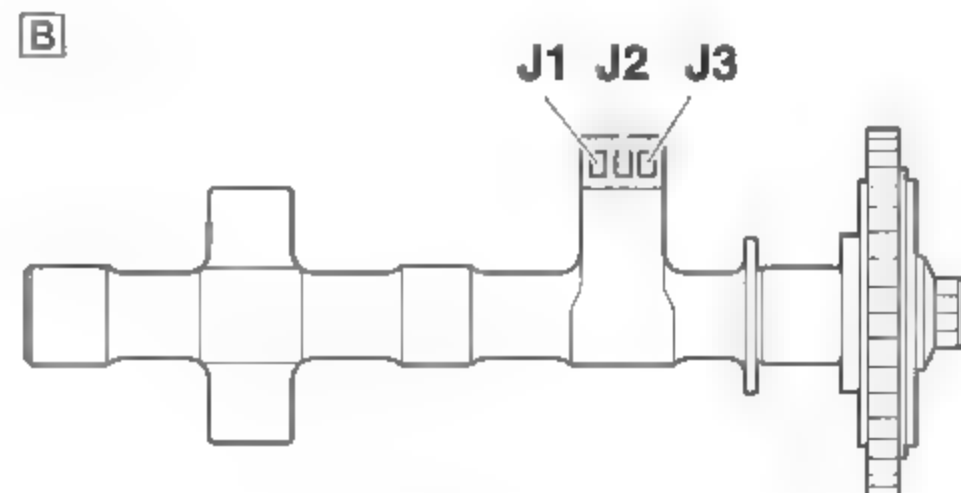
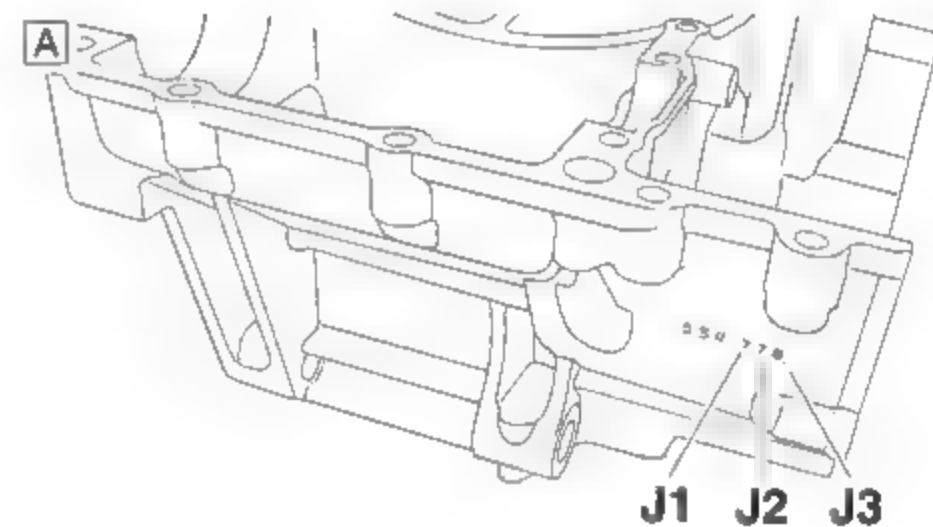
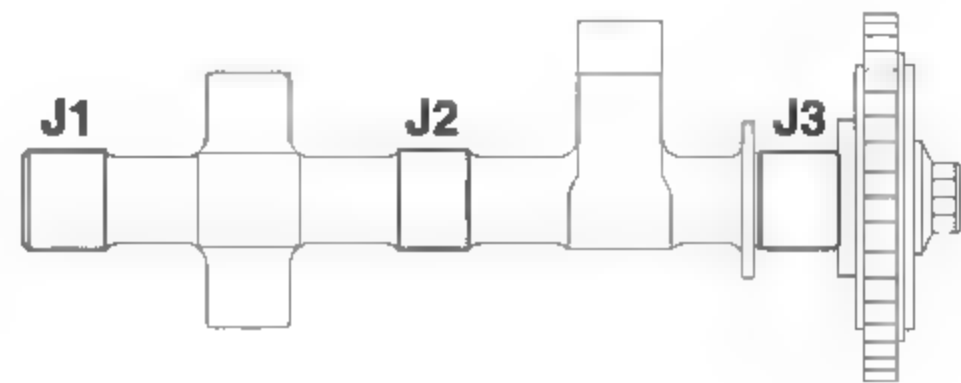


5. Select:

- Balancer shaft journal bearings (J₁–J₃)

TIP

- The numbers "A" stamped into the crankcase and the numbers "B" stamped into the balancer shaft web are used to determine the replacement balancer shaft journal bearing sizes.
- J₁–J₃ refer to the bearings shown in the crankcase and balancer shaft web illustration.
- If J₁–J₃ are the same, use the same size for all of the bearings.



For example, if the crankcase J₁ and balancer shaft web J₁ numbers are 6 and 5 respectively, then the bearing size for J₁ is:

$ \begin{aligned} &J_1 \text{ (crankcase)} - J_1 \text{ (balancer shaft web)} \\ &= 6 - 5 \\ &= 1 \text{ (blue)} \end{aligned} $

CRANKSHAFT AND BALANCER SHAFT



Bearing color code

- Code 1
Blue
- Code 2
Black
- Code 3
Brown
- Code 4
Green
- Code 5
Yellow

EAS31075

CHECKING THE CRANKSHAFT

1. Check:

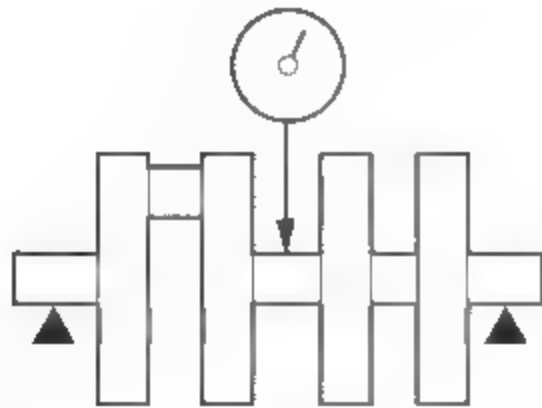
- Balancer drive gear
Damage/wear → Replace the balancer drive gear and balancer shaft assembly as a set.
Excessive noise during operation → Replace the balancer drive gear and balancer shaft assembly as a set.

2. Measure:

- Crankshaft runout
Out of specification → Replace the crankshaft.



Runout limit
0.030 mm (0.0012 in)



G089016

3. Check:

- Crankshaft journal surfaces
- Crankshaft pin surfaces
- Bearing surfaces
Scratches/wear → Replace the crankshaft.

4. Measure:

- Crankshaft-journal-to-crankshaft-journal-bearing clearance
Out of specification → Replace the crankshaft journal bearings.



Journal oil clearance
0.018–0.042 mm (0.0007–0.0017 in)

ECA13920

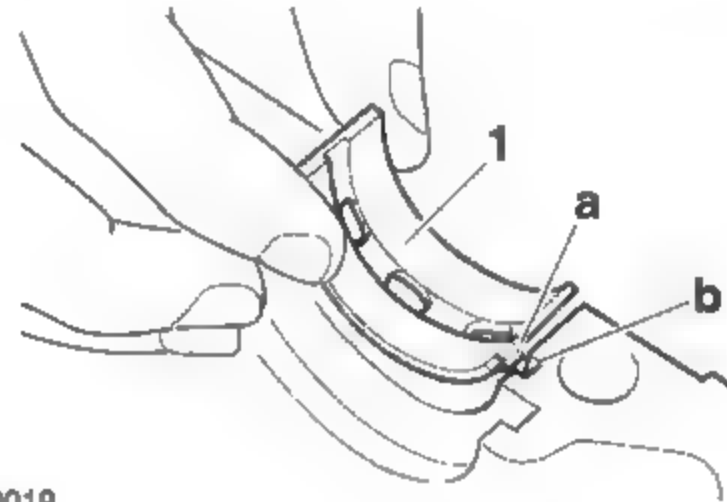
NOTICE

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

- a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the cylinder and crankcase.
- b. Install the crankshaft journal upper bearings "1" and the crankshaft into the cylinder.

TIP

Align the projections "a" on the crankshaft journal upper bearings with the notches "b" in the cylinder.

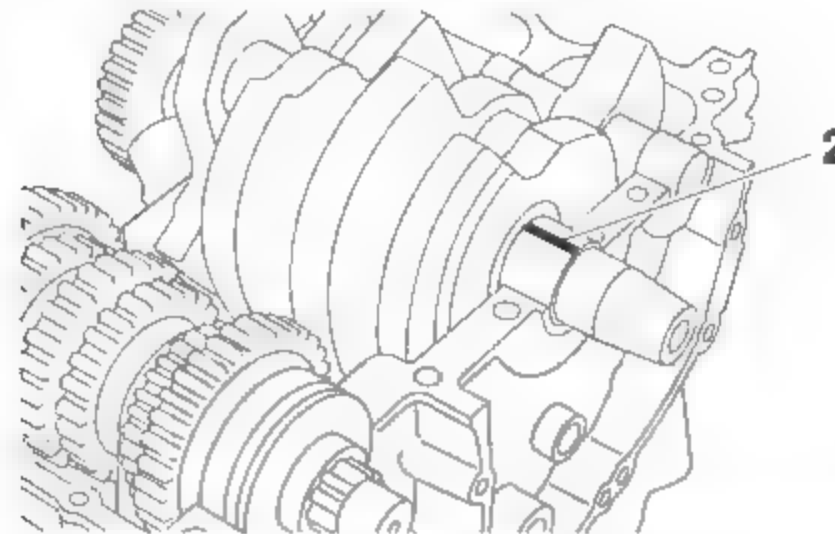


G089019

- c. Put a piece of Plastigauge® "2" on each crankshaft journal.

TIP

Do not put the Plastigauge® over the oil hole in the crankshaft journal.



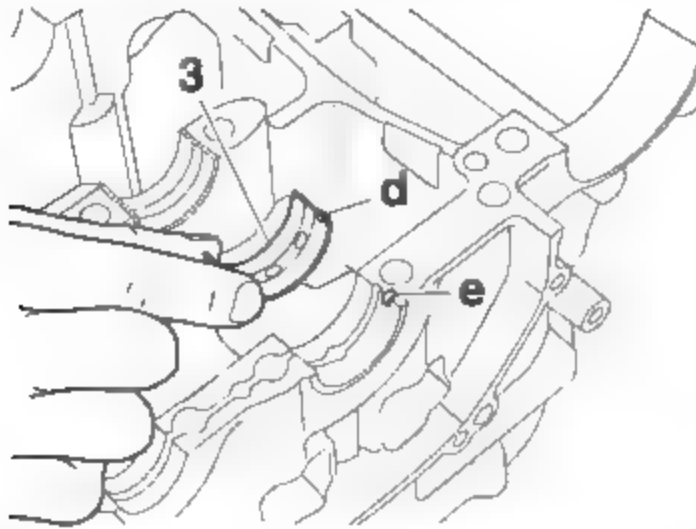
- d. Install the crankshaft journal lower bearings "3" into the crankcase and assemble the crankcase and cylinder.

TIP

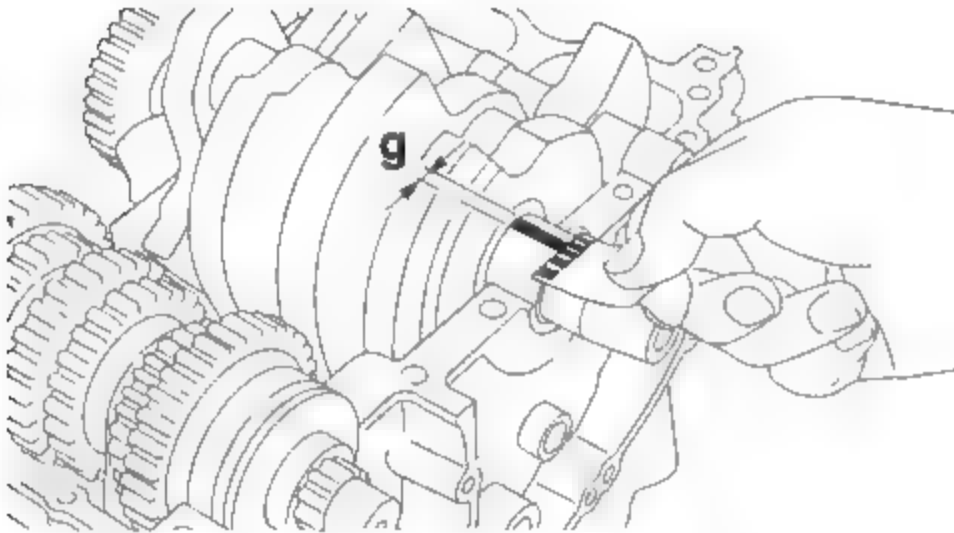
- Align the projections "d" of the crankshaft journal lower bearings with the notches "e" in the crankcase.

CRANKSHAFT AND BALANCER SHAFT

- Do not move the crankshaft until the clearance measurement has been completed.



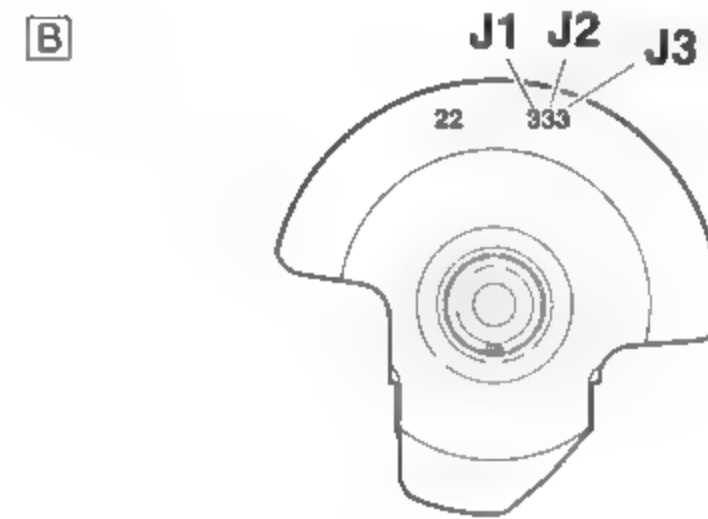
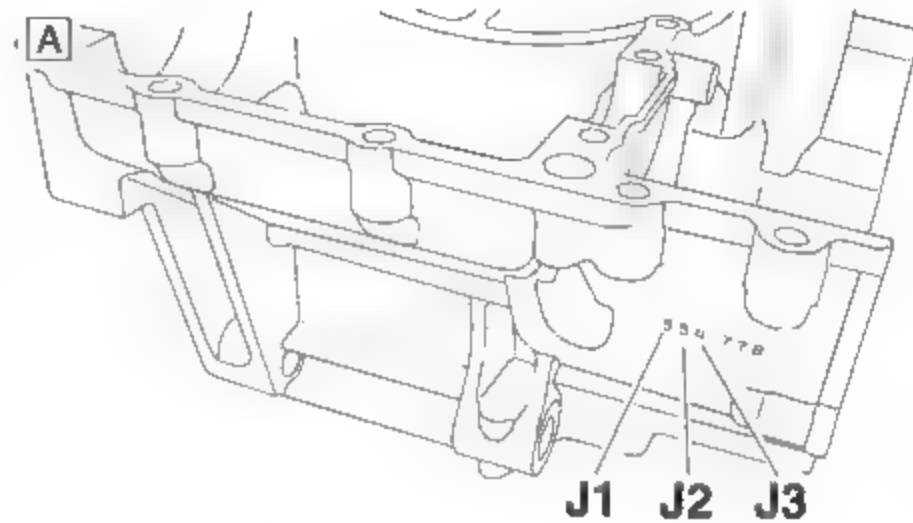
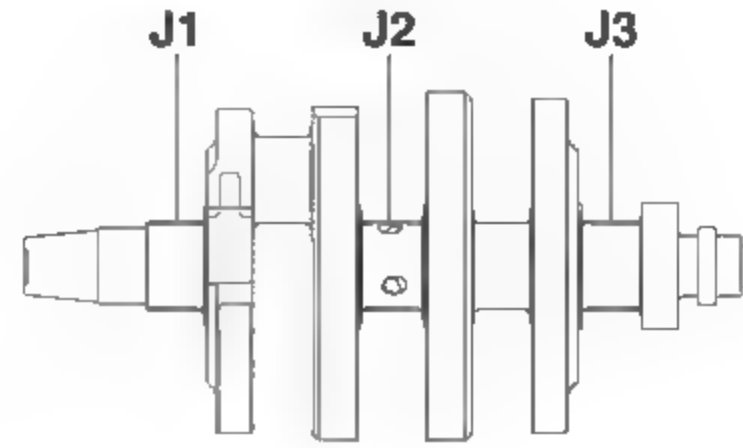
- Tighten the bolts to specification in the tightening sequence cast on the crankcase.
Refer to "CRANKCASE" on page 5-70.
- Remove the crankcase and the crankshaft journal lower bearings.
- Measure the compressed Plastigauge® width "g" on each crankshaft journal.
If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.



- Select:
 - Crankshaft journal bearings (J₁-J₃)

TIP

- The numbers "A" stamped into the crankcase and the numbers "B" stamped into the crankshaft web are used to determine the replacement crankshaft journal bearing sizes.
- J₁-J₃ refer to the bearings shown in the crankcase and crankshaft web illustration.
- If J₁-J₃ are the same, use the same size for all of the bearings.



For example, if the crankcase J₁ and crankshaft web J₁ numbers are 5 and 3 respectively, then the bearing size for J₁ is:

$$\begin{aligned} &J_1 \text{ (crankcase)} - J_1 \text{ (crankshaft web)} - 2 \\ &= 5 - 3 - 2 \\ &= 0 \text{ (white-pink)} \end{aligned}$$



Bearing color code
Model identification color
 Pink
 Code -1
 Purple
 Code 0
 White
 Code 1
 Blue
 Code 2
 Black
 Code 3
 Brown

CRANKSHAFT AND BALANCER SHAFT

EAS31077

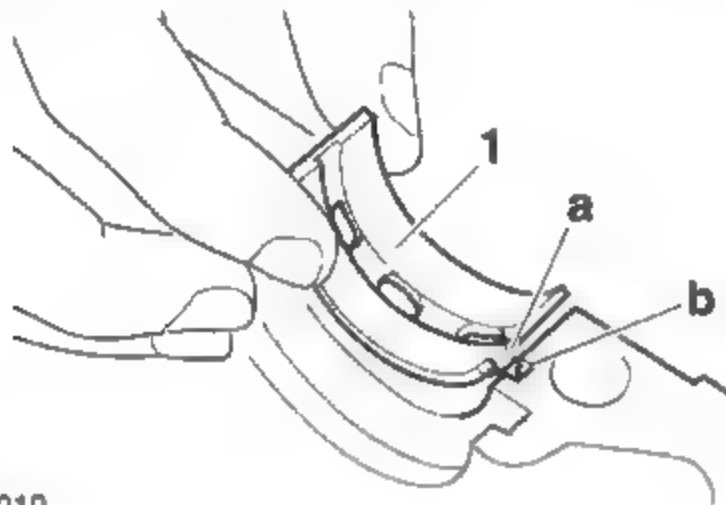
INSTALLING THE CRANKSHAFT

1. Install:

- Crankshaft journal upper bearings (into the upper crankcase)
- Crankshaft journal lower bearings (into the lower crankcase)

TIP

- Align the projections "a" on the crankshaft journal bearings "1" with the notches "b" in the crankcase.
- Be sure to install each crankshaft journal bearing in its original place.



G089019

EAS31078

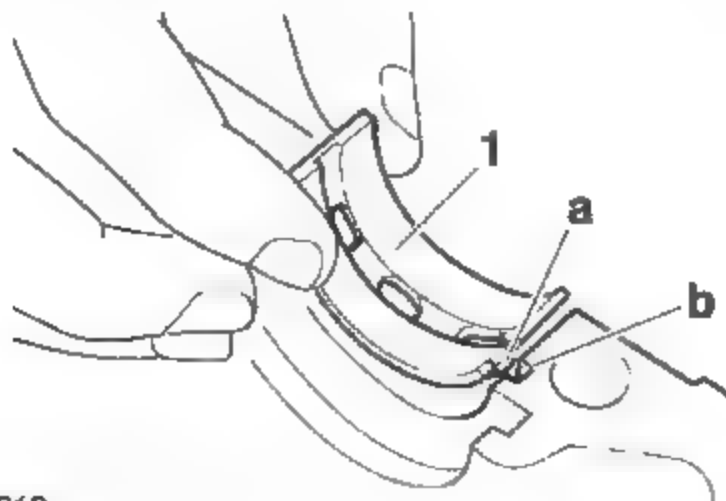
INSTALLING THE BALANCER SHAFT ASSEMBLY

1. Install:

- Balancer shaft journal upper bearings (into the upper crankcase)
- Balancer shaft journal lower bearings (into the lower crankcase)

TIP

- Align the projections "a" on the balancer shaft journal bearings "1" with the notches "b" in the crankcase.
- Be sure to install each balancer shaft journal bearing in its original place.



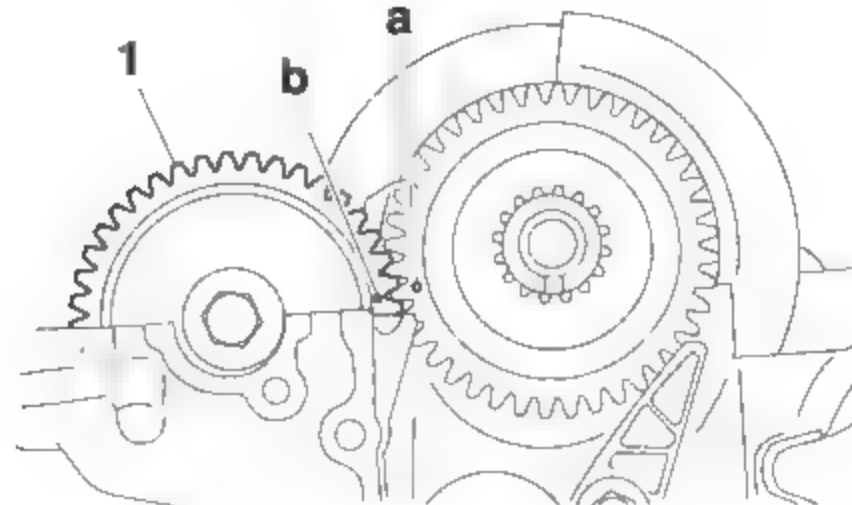
G089019

2. Install:

- Balancer shaft "1"

TIP

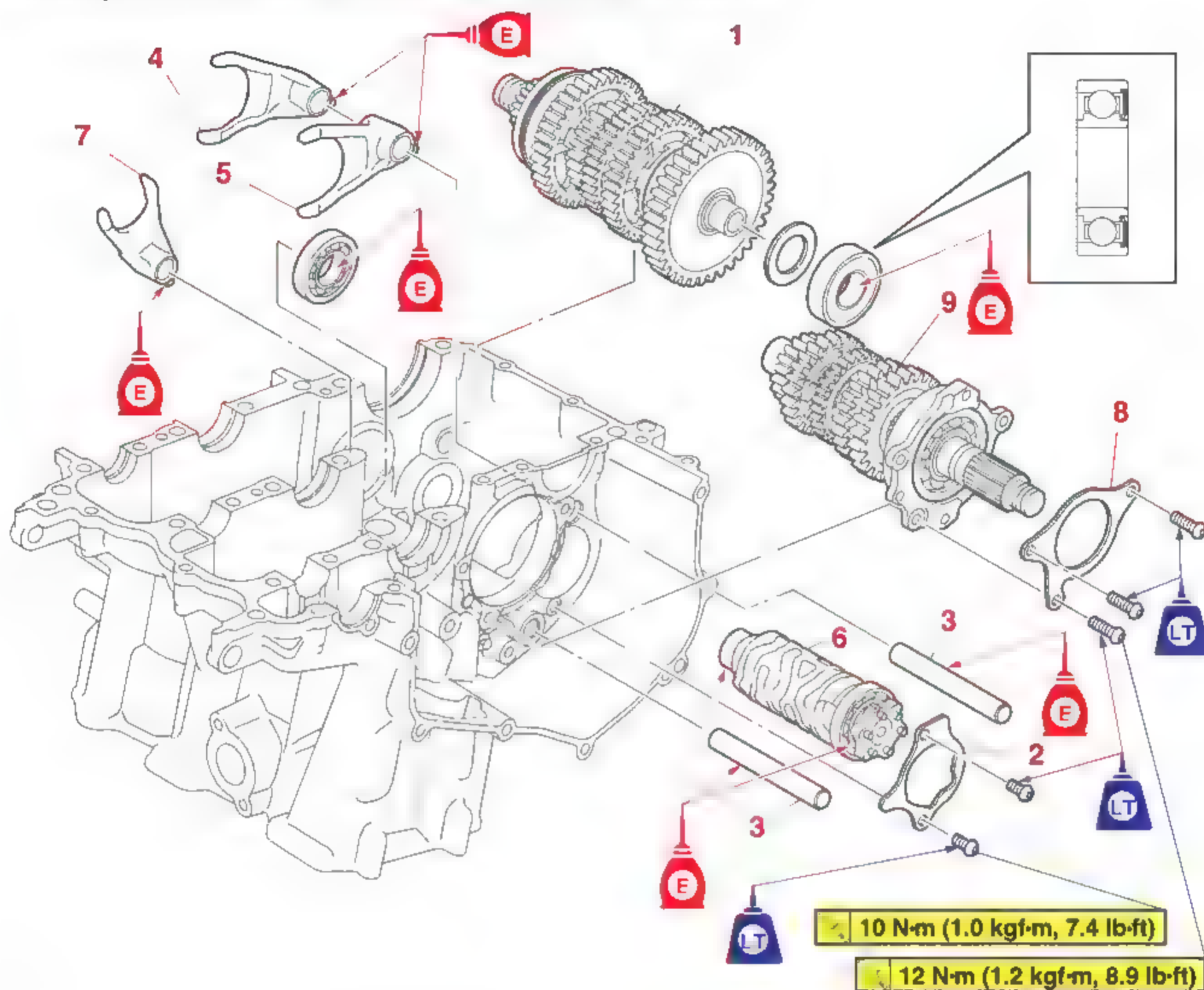
Align the punch mark "a" in the balancer drive gear with the punch mark "b" in the balancer driven gear.



EAS20062

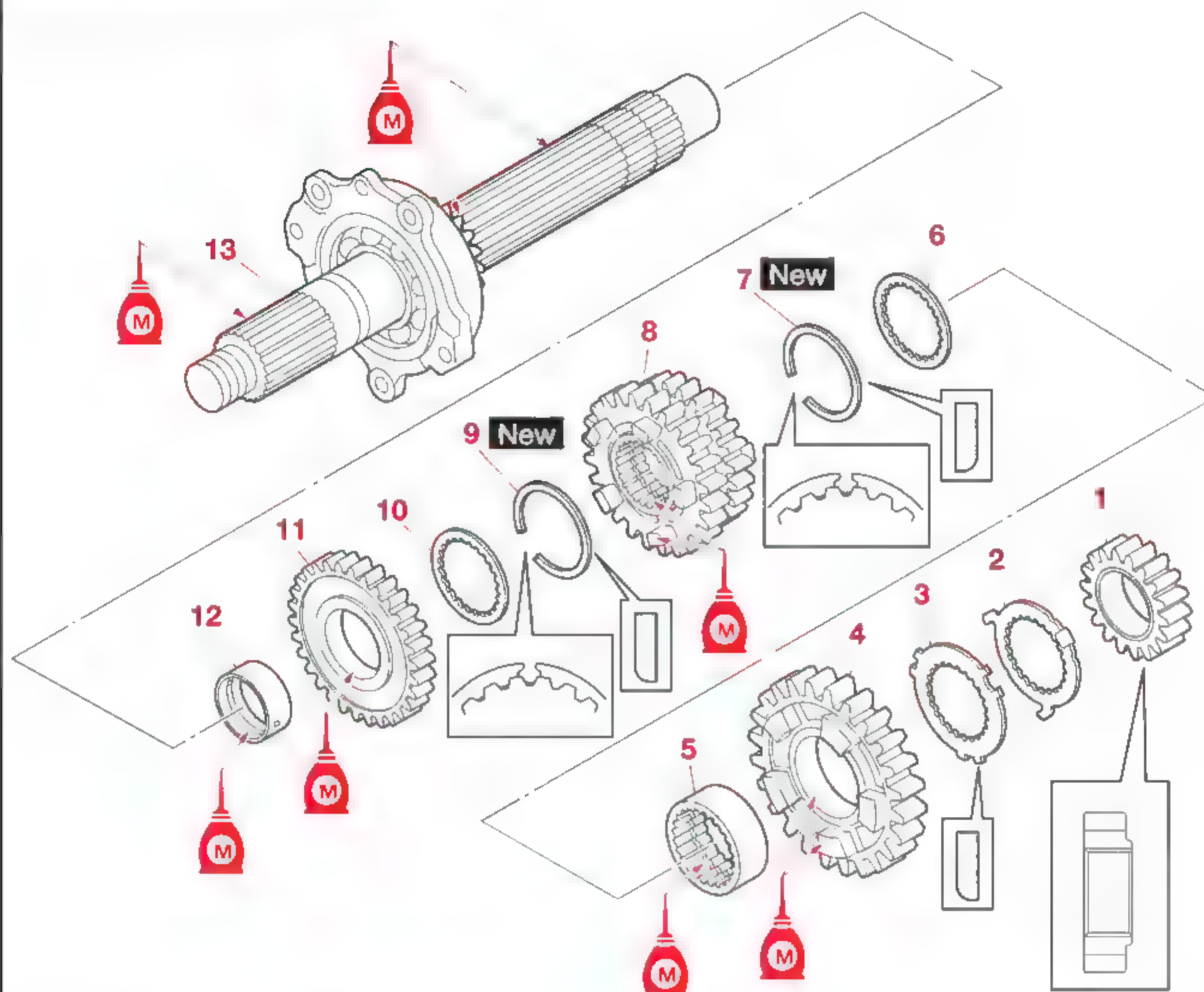
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



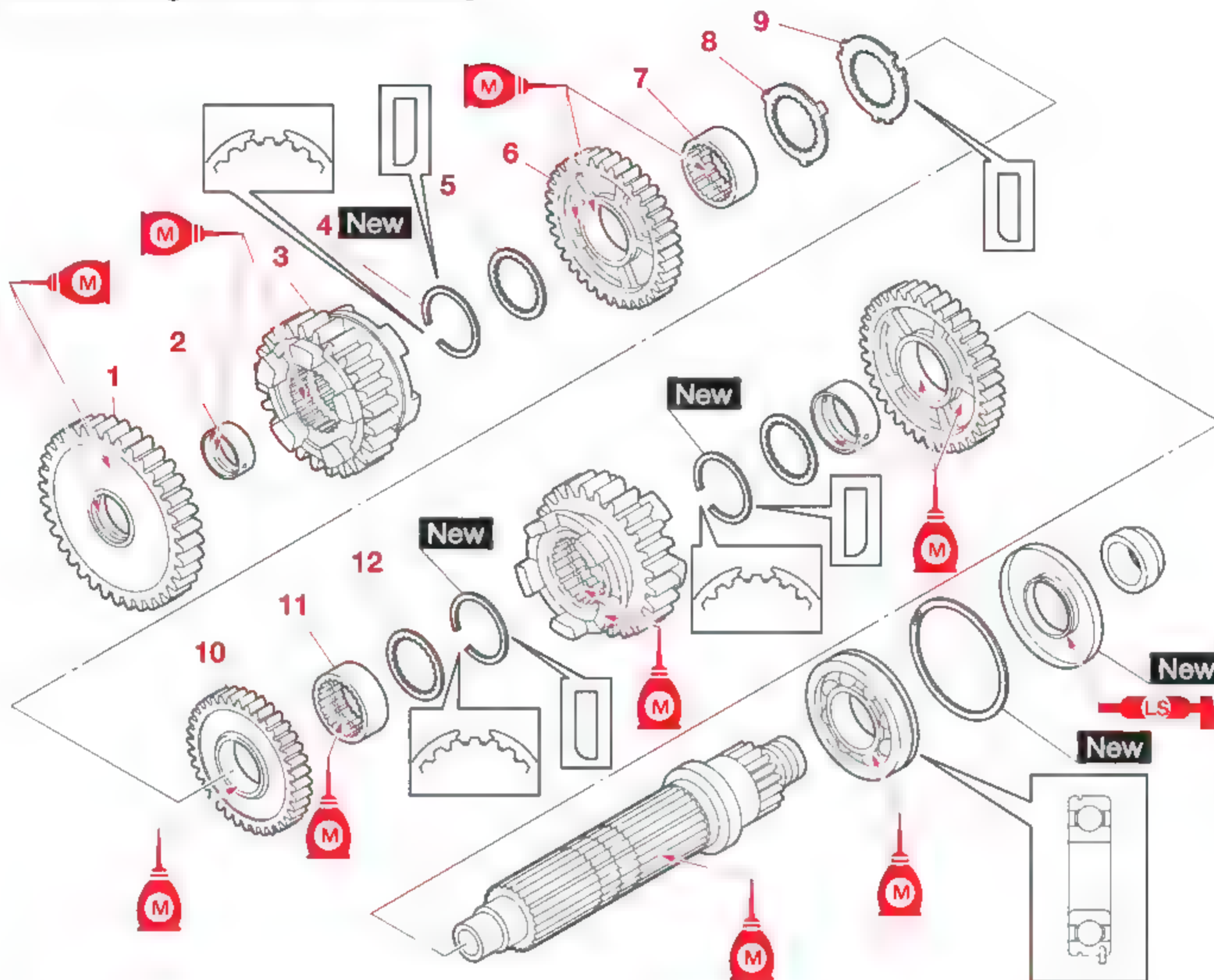
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-70.
1	Drive axle assembly	1	
2	Shift drum retainer	1	
3	Shift fork guide bar	2	
4	Shift fork "L"	1	
5	Shift fork "R"	1	
6	Shift drum assembly	1	
7	Shift fork "C"	1	
8	Bearing retainer	1	
9	Main axle assembly	1	

Disassembling the main axle assembly



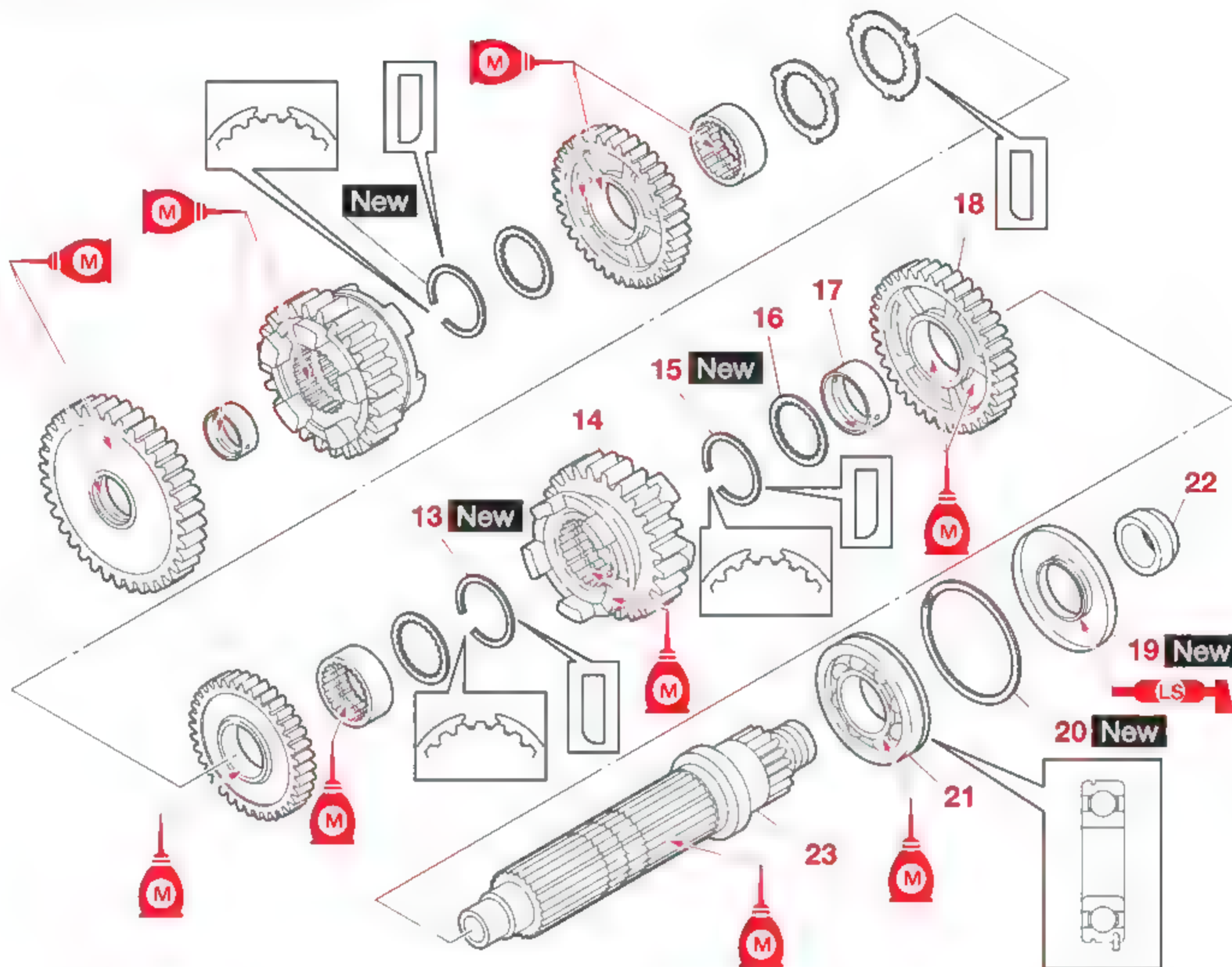
Order	Job/Parts to remove	Q'ty	Remarks
1	2nd pinion gear	1	
2	Toothed lock washer	1	
3	Toothed lock washer retainer	1	
4	6th pinion gear	1	
5	Collar	1	
6	Washer	1	
7	Circlip	1	
8	3rd pinion gear	1	
9	Circlip	1	
10	Washer	1	
11	5th pinion gear	1	
12	Collar	1	
13	Main axle	1	

Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	1st wheel gear	1	
2	Collar	1	
3	5th wheel gear	1	
4	Circlip	1	
5	Washer	1	
6	3rd wheel gear	1	
7	Collar	1	
8	Toothed lock washer	1	
9	Toothed lock washer retainer	1	
10	4th wheel gear	1	
11	Collar	1	
12	Washer	1	

Disassembling the drive axle assembly



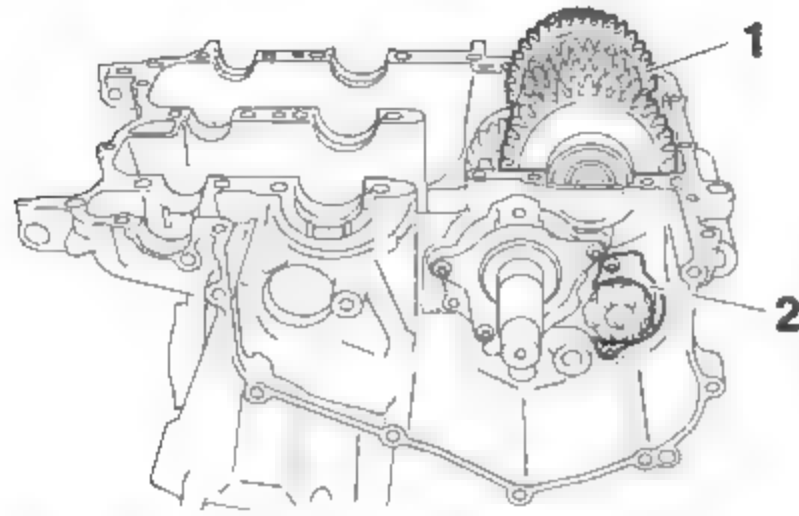
Order	Job/Parts to remove	Q'ty	Remarks
13	Circlip	1	
14	6th wheel gear	1	
15	Circlip	1	
16	Washer	1	
17	Collar	1	
18	2nd wheel gear	1	
19	Oil seal	1	
20	Circlip	1	
21	Bearing	1	
22	Collar	1	
23	Drive axle	1	

EAS30430

REMOVING THE TRANSMISSION

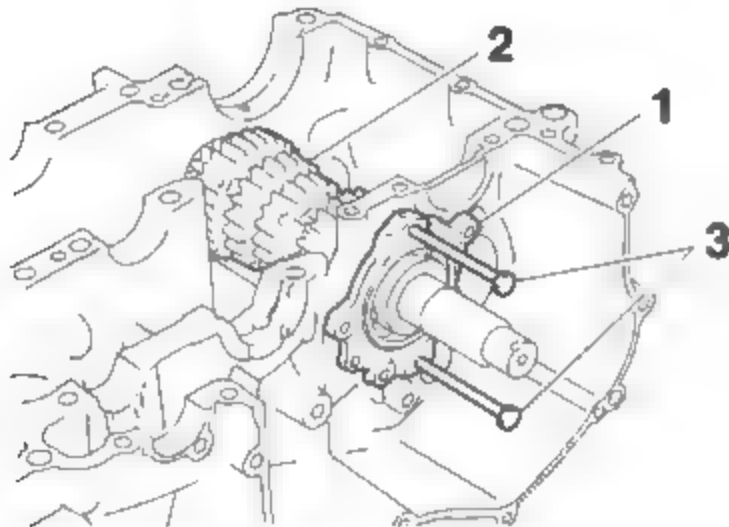
1. Remove:

- Drive axle assembly "1"
- Shift drum retainer "2"
- Shift fork guide bars
- Shift fork "L" and "R"
- Shift drum assembly
- Shift fork "C"



2. Remove:

- Bearing retainer
- Main axle assembly bearing housing "1"
- Main axle assembly "2"
- a. Insert two bolts "3" of the proper size, as shown in the illustration, into the main axle assembly bearing housing.



- b. Tighten the bolts until they contact the crankcase surface.
- c. Continue tightening the bolts until the main axle assembly comes free from the cylinder.

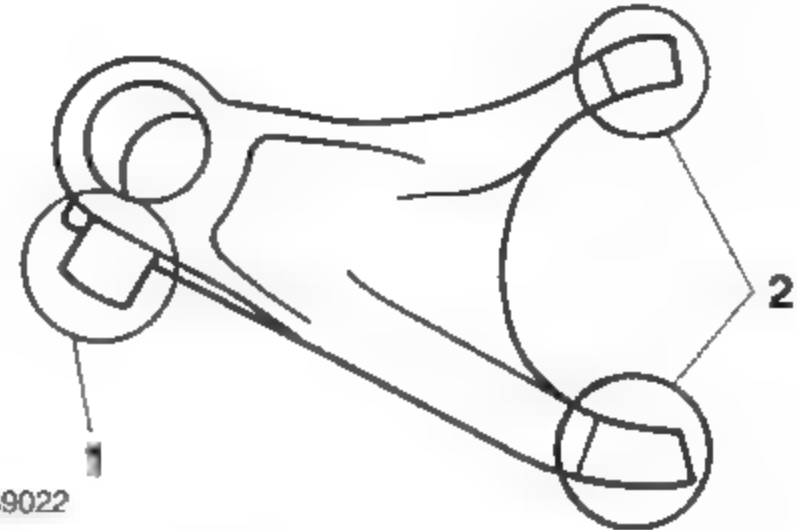
EAS30431

CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

1. Check:

- Shift fork cam follower "1"
 - Shift fork pawl "2"
- Bends/damage/scoring/wear → Replace the shift fork.



G089022

2. Check:

- Shift fork guide bar
- Roll the shift fork guide bar on a flat surface.
Bends → Replace.

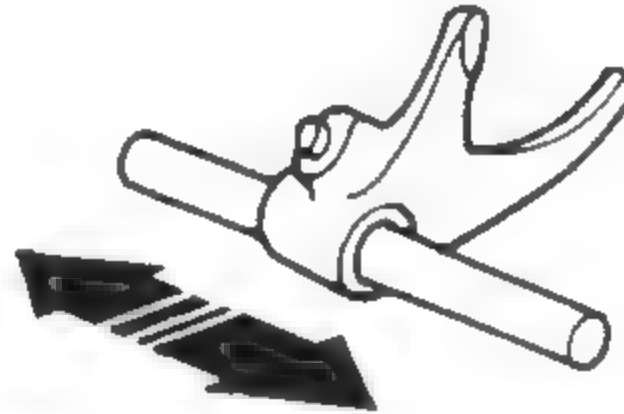
EWA12840

WARNING

Do not attempt to straighten a bent shift fork guide bar.

3. Check:

- Shift fork movement (along the shift fork guide bar)
- Rough movement → Replace the shift forks and shift fork guide bar as a set.



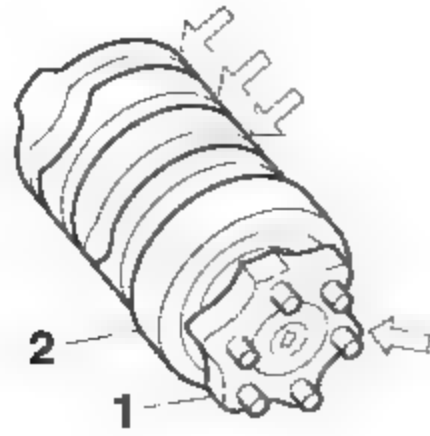
G089023

EAS30432

CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:

- Shift drum groove
- Damage/scratches/wear → Replace the shift drum assembly.
- Shift drum segment "1"
- Damage/wear → Replace the shift drum assembly.
- Shift drum bearing "2"
- Damage/pitting → Replace the shift drum assembly.



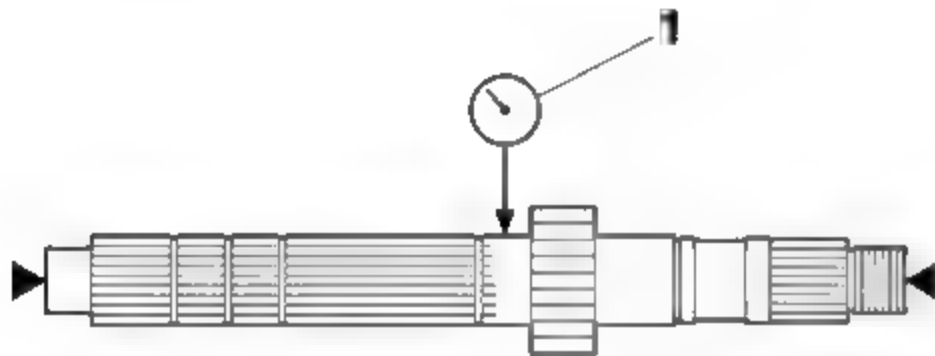
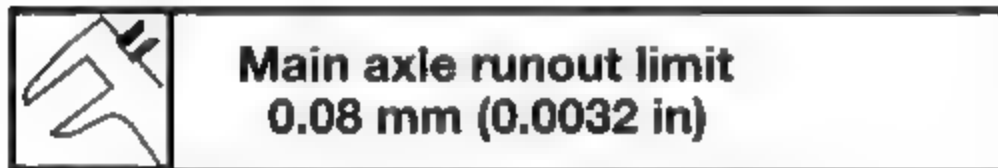
G089024

EAS30433

CHECKING THE TRANSMISSION

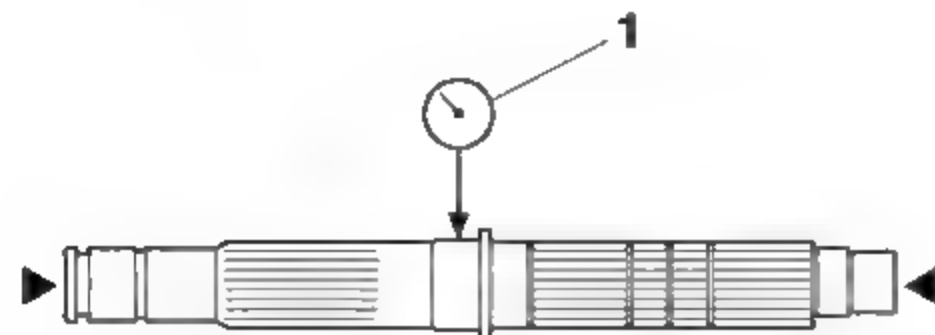
1. Measure:

- Main axle runout
(with a centering device and dial gauge "1")
Out of specification → Replace the main axle.



2. Measure:

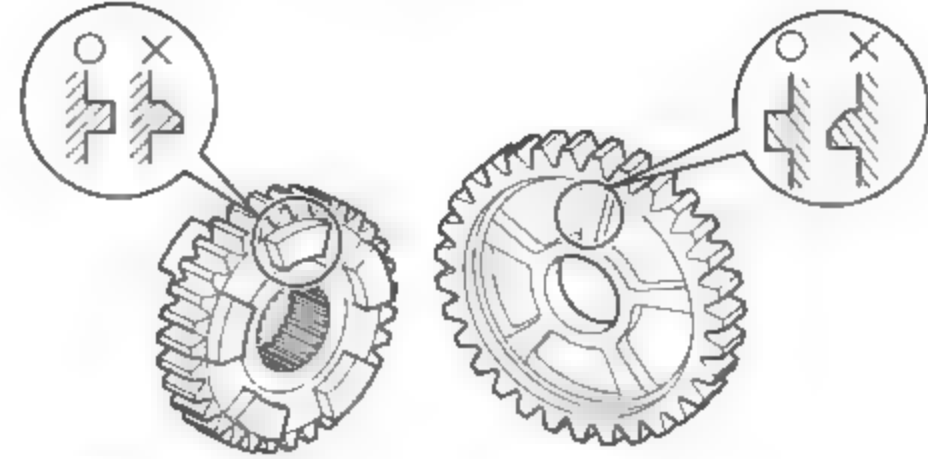
- Drive axle runout
(with a centering device and dial gauge "1")
Out of specification → Replace the drive axle.



3. Check:

- Transmission gears
Blue discoloration/pitting/wear → Replace the defective gear(s).

- Transmission gear dogs
Cracks/damage/rounded edges → Replace the defective gear(s).



G089025

4. Check:

- Transmission gear engagement
(each pinion gear to its respective wheel gear)
Incorrect → Reassemble the transmission axle assemblies.

5. Check:

- Transmission gear movement
Rough movement → Replace the defective part(s).

6. Check:

- Circlips
Bends/damage/looseness → Replace.

EAS30435

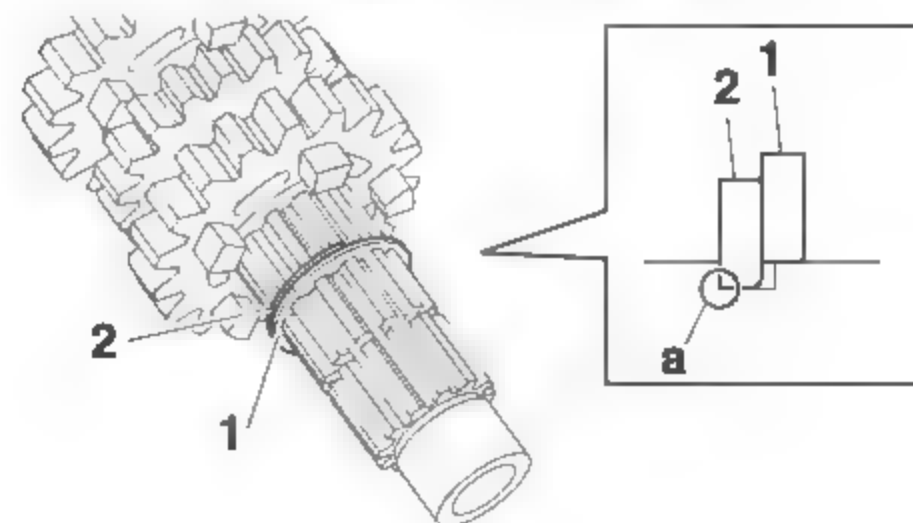
ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:

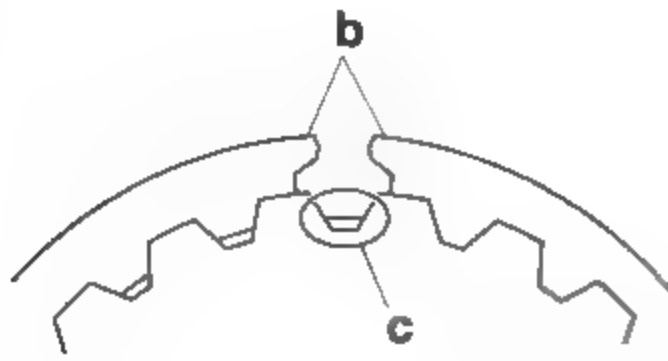
- Toothed washer "1"
- Circlip "2" **New**

TIP

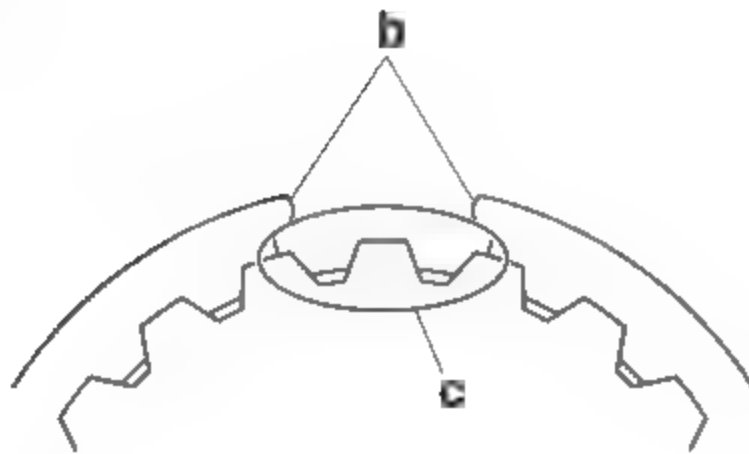
- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the toothed washer and gear.
- Align the opening between the ends "b" of the circlip with a groove "c" in the axle.



A



B



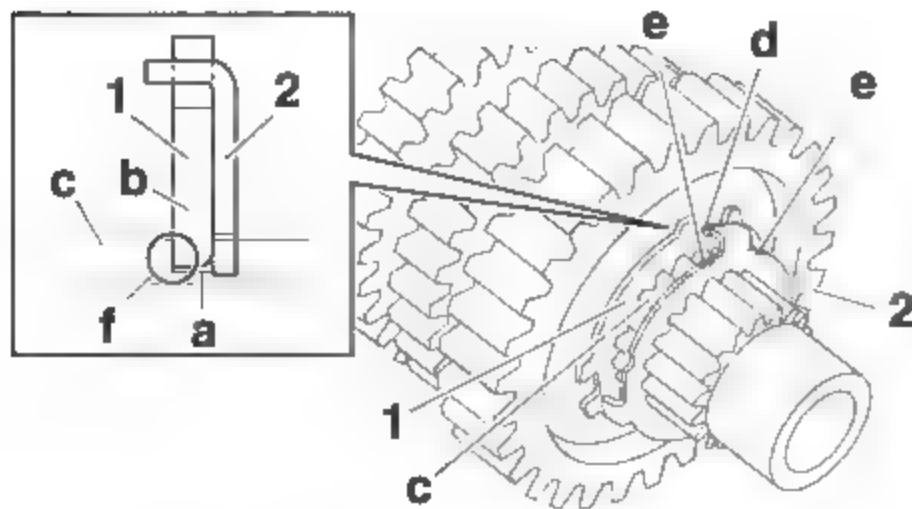
- A. Main axle
- B. Drive axle

2. Install:

- Toothed lock washer retainer "1"
- Toothed lock washer "2"

TIP

- With the toothed lock washer retainer in the groove "a" in the axle, align the projection "b" on the retainer with an axle spline "c", and then install the toothed lock washer.
- Be sure to align the projection on the toothed lock washer that is between the alignment marks "e" with the alignment mark "d" on the retainer.
- Be sure the toothed lock washer retainer sharp-edged corner "f" is positioned opposite side to the toothed lock washer.



EAS30438

INSTALLING THE TRANSMISSION

1. Install:

- Main axle assembly "1"

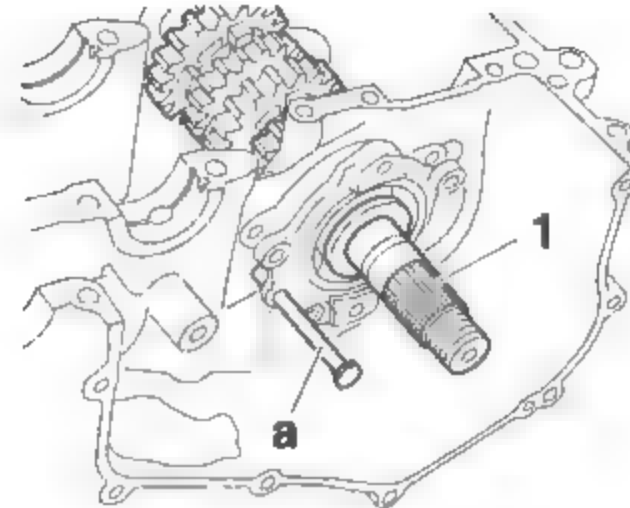
- Bearing retainer



Bearing retainer bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®

TIP

Use a suitable pin "a" to position the bearing housing, and then install the housing until it contacts the cylinder.



2. Install:

- Shift fork "C"
- Shift drum assembly
- Shift fork guide bar

TIP

- The embossed marks on the shift forks should face towards the right side of the engine.
- Install shift fork "C" into the groove in the 3rd pinion gear on the main axle.

3. Install:

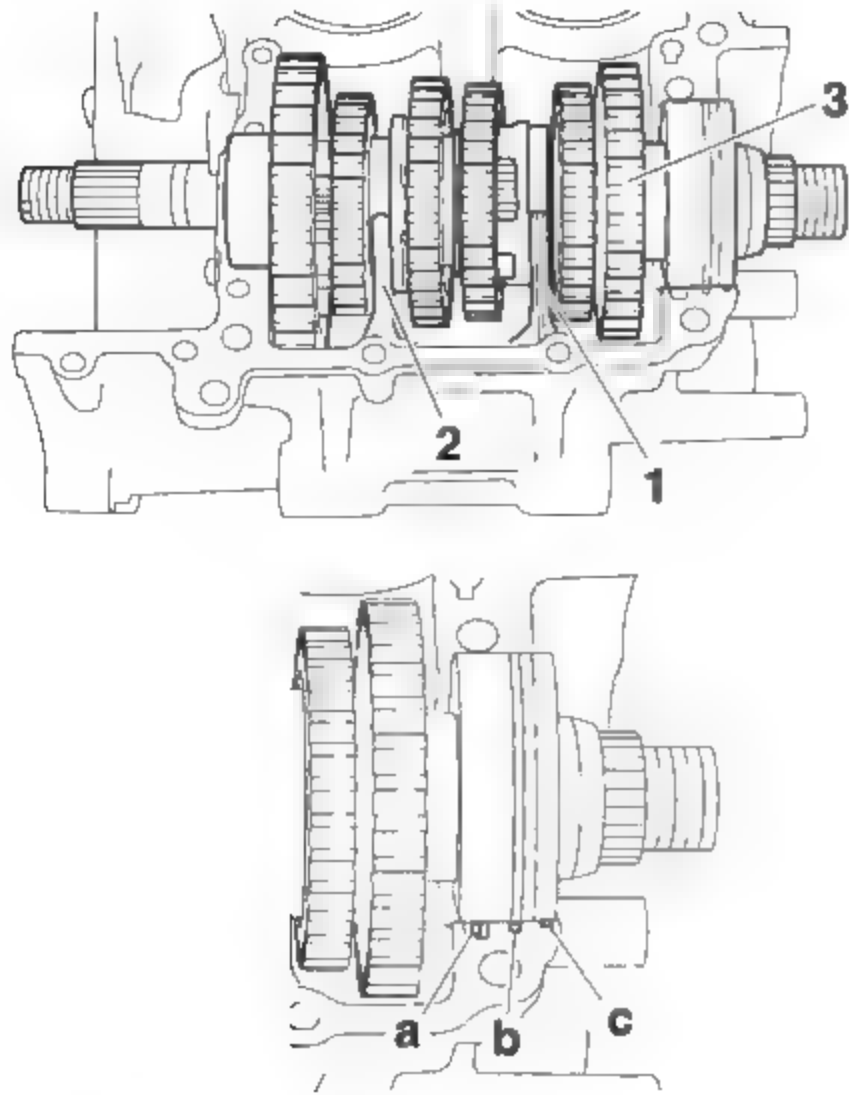
- Shift fork "L" "1"
- Shift fork "R" "2"
- Shift fork guide bar
- Shift drum retainer
- Drive axle assembly "3"



Shift drum retainer bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)
LOCTITE®

TIP

- Install shift fork "L" into the groove in the 6th wheel gear and shift fork "R" into the groove in the 5th wheel gear on the drive axle.
- Make sure that the projection "a" on the drive axle assembly is inserted into the slot in the cylinder.
- Make sure that the drive axle bearing circlip "b" and flange "c" of the oil seal are inserted into the grooves in the cylinder.



4. Check:
- Transmission
- Rough movement → Repair.

TIP _____

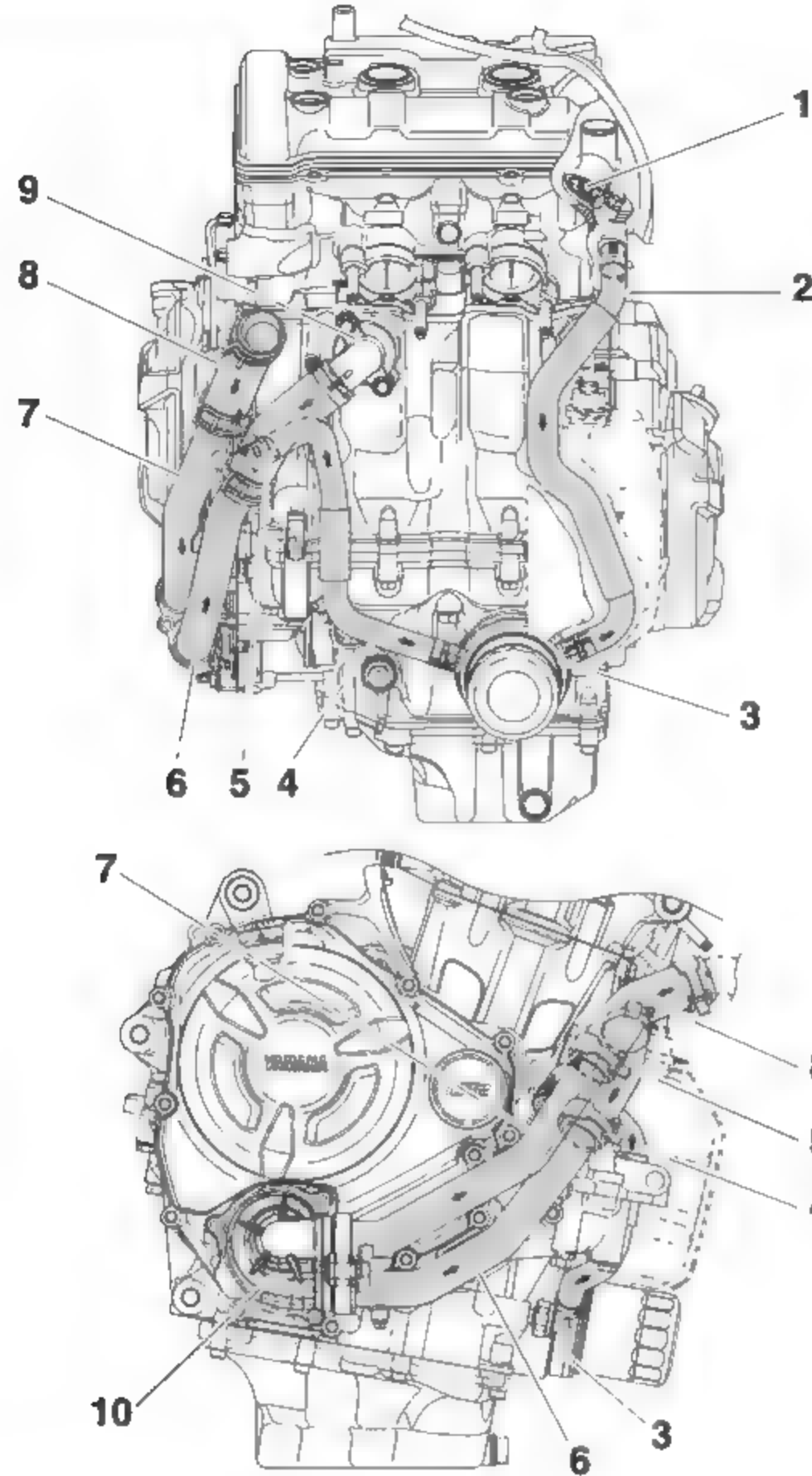
Oil each gear, shaft, and bearing thoroughly.

COOLING SYSTEM

COOLING SYSTEM DIAGRAMS.....	6-1
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CHECKING THE RADIATOR	6-4
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EAS20289

COOLING SYSTEM DIAGRAMS

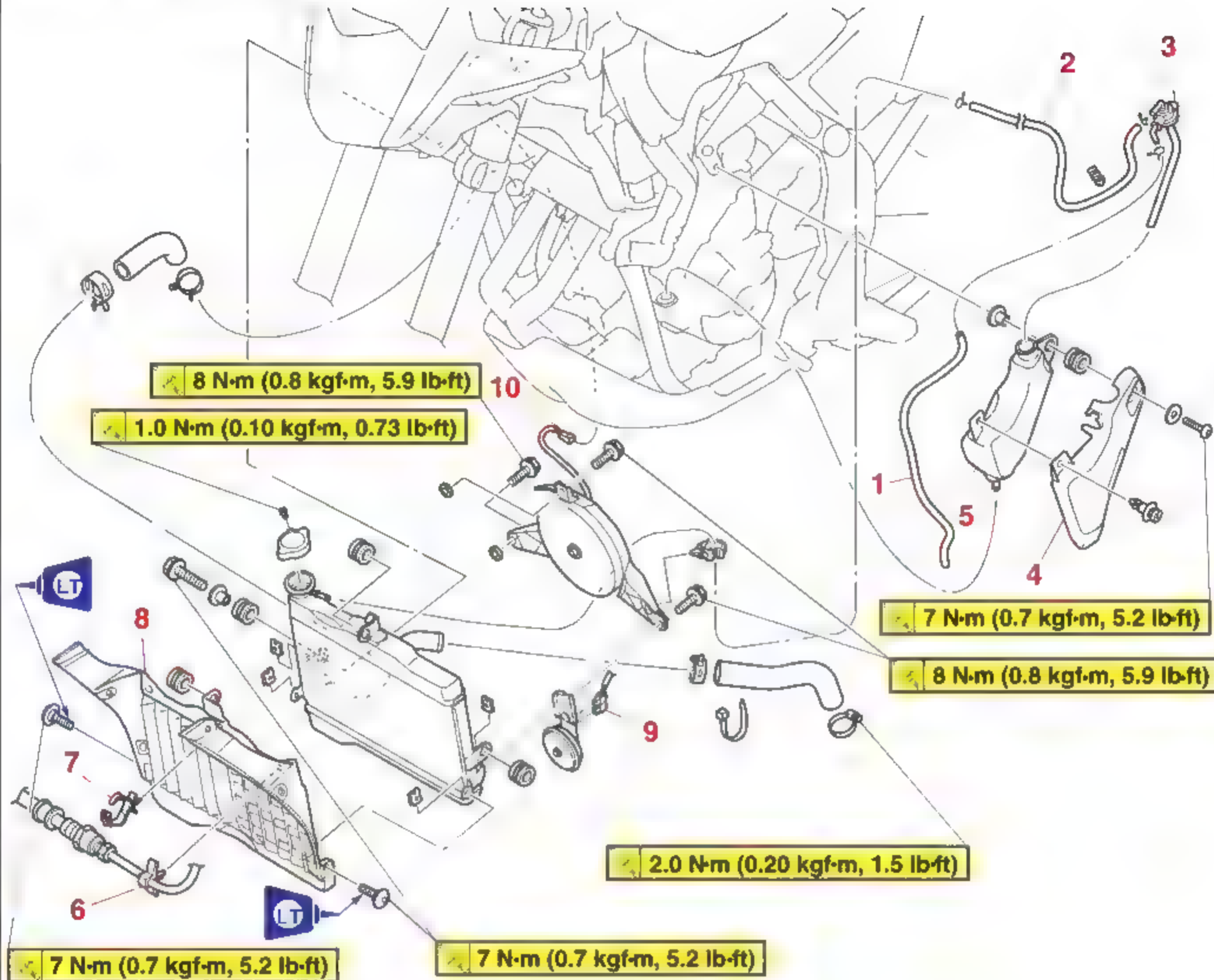


1. Thermostat
2. Oil cooler inlet hose
3. Oil cooler
4. Oil cooler outlet hose
5. Water jacket joint inlet hose
6. Water pump outlet pipe
7. Water pump inlet pipe
8. Radiator outlet hose
9. Water jacket joint
10. Water pump

EAS20063

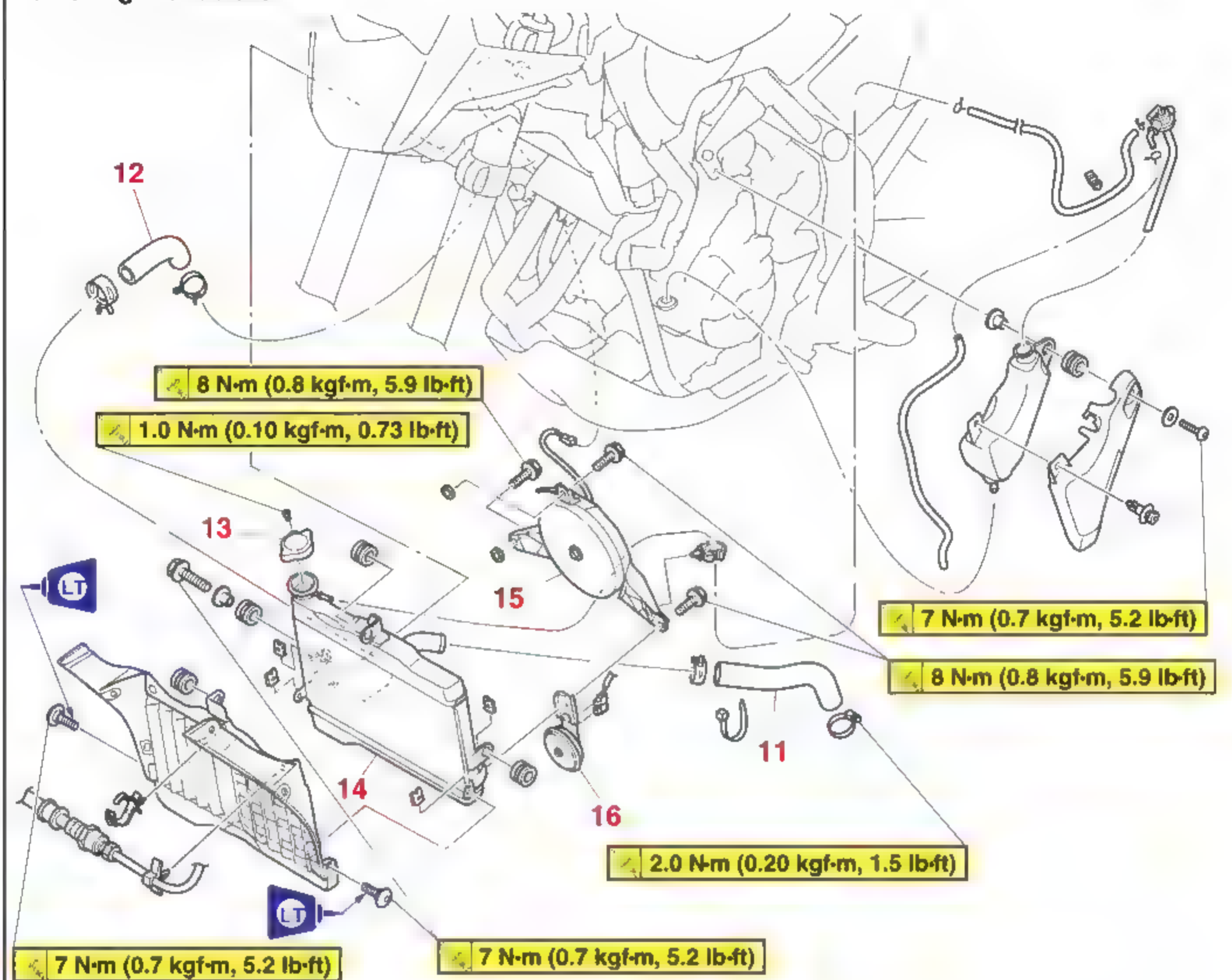
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-28.
	Air scoops		Refer to "GENERAL CHASSIS (3)" on page 4-5.
1	Coolant reservoir breather hose	1	
2	Coolant reservoir hose	1	
3	Coolant reservoir cap	1	
4	Coolant reservoir cover	1	
5	Coolant reservoir	1	
6	Holder	1	
7	Holder	1	Open.
8	Radiator cover	1	
9	Horn connector	2	Disconnect.
10	Radiator fan motor coupler	1	Disconnect.

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
11	Radiator inlet hose	1	
12	Radiator outlet hose	1	
13	Radiator cap	1	
14	Radiator	1	
15	Radiator fan motor	1	
16	Horn	1	

EAS30439

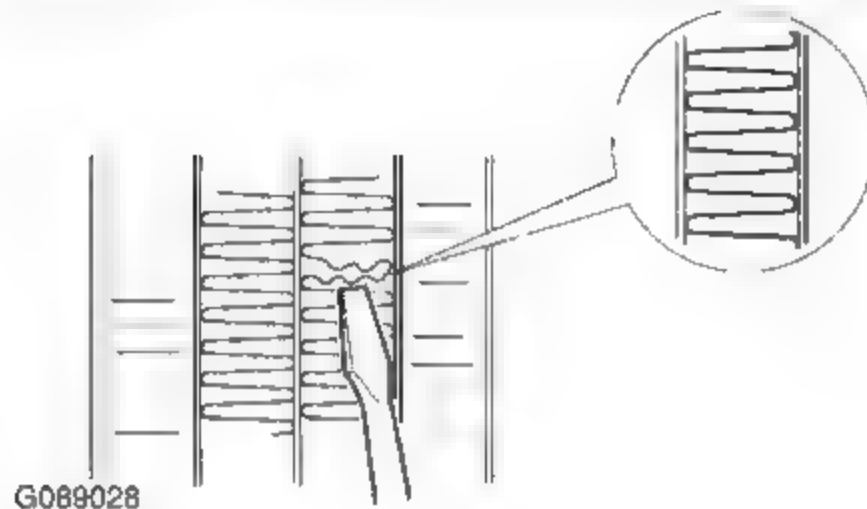
CHECKING THE RADIATOR

1. Check:

- Radiator fins
Obstruction → Clean.
Apply compressed air to the rear of the radiator.
- Damage → Repair or replace.

TIP

Straighten any flattened fins with a thin, flat-head screwdriver.



G089028

2. Check:

- Radiator hoses
Cracks/damage → Replace.
- Radiator pipes
Cracks/damage → Replace the radiator.

3. Measure:

- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.



Radiator cap valve opening pressure

107.9–137.3 kPa (1.08–1.37 kgf/cm², 15.6–19.9 psi)

- Install the radiator cap tester "1" and radiator cap tester adapter "2" to the radiator cap "3".

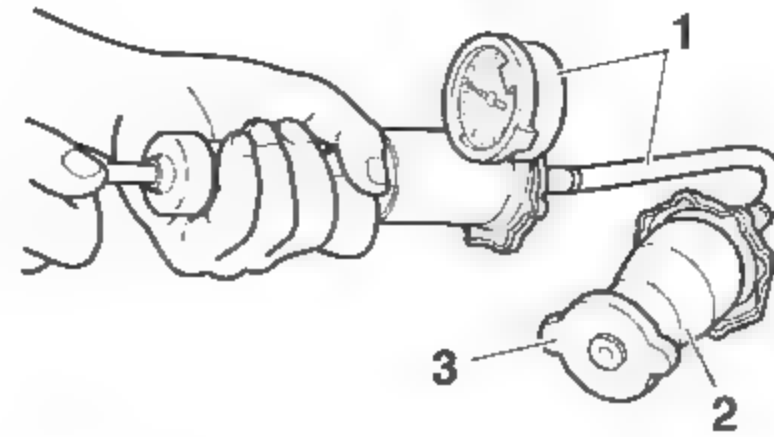


Radiator cap tester 90890-01325

Mityvac cooling system tester kit
YU-24460-A

Radiator cap tester adapter
90890-01352

Pressure tester adapter
YU-33984



G089029

- Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

4. Check:

- Radiator fan
Damage → Replace.
Malfunction → Check and repair.
Refer to "COOLING SYSTEM" on page 8-27.

EAS30440

INSTALLING THE RADIATOR

1. Fill:

- Cooling system
(with the specified amount of the recommended coolant)
Refer to "CHANGING THE COOLANT" on page 3-28.

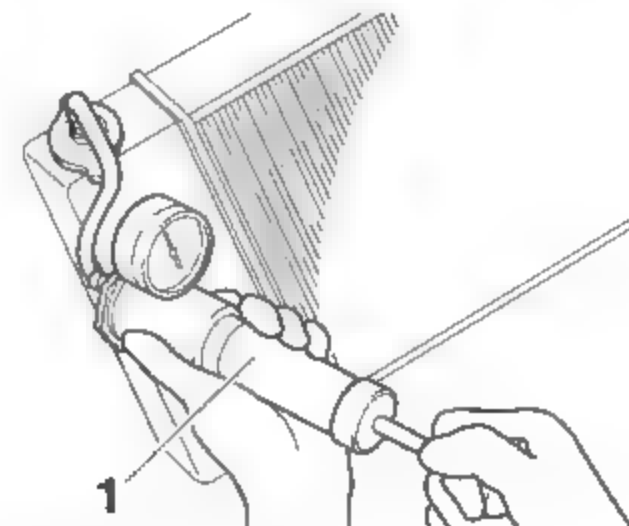
2. Check:

- Cooling system
Leaks → Repair or replace any faulty part.
 - Attach the radiator cap tester "1" to the radiator.



Radiator cap tester 90890-01325

Mityvac cooling system tester kit
YU-24460-A



- Apply specified pressure.



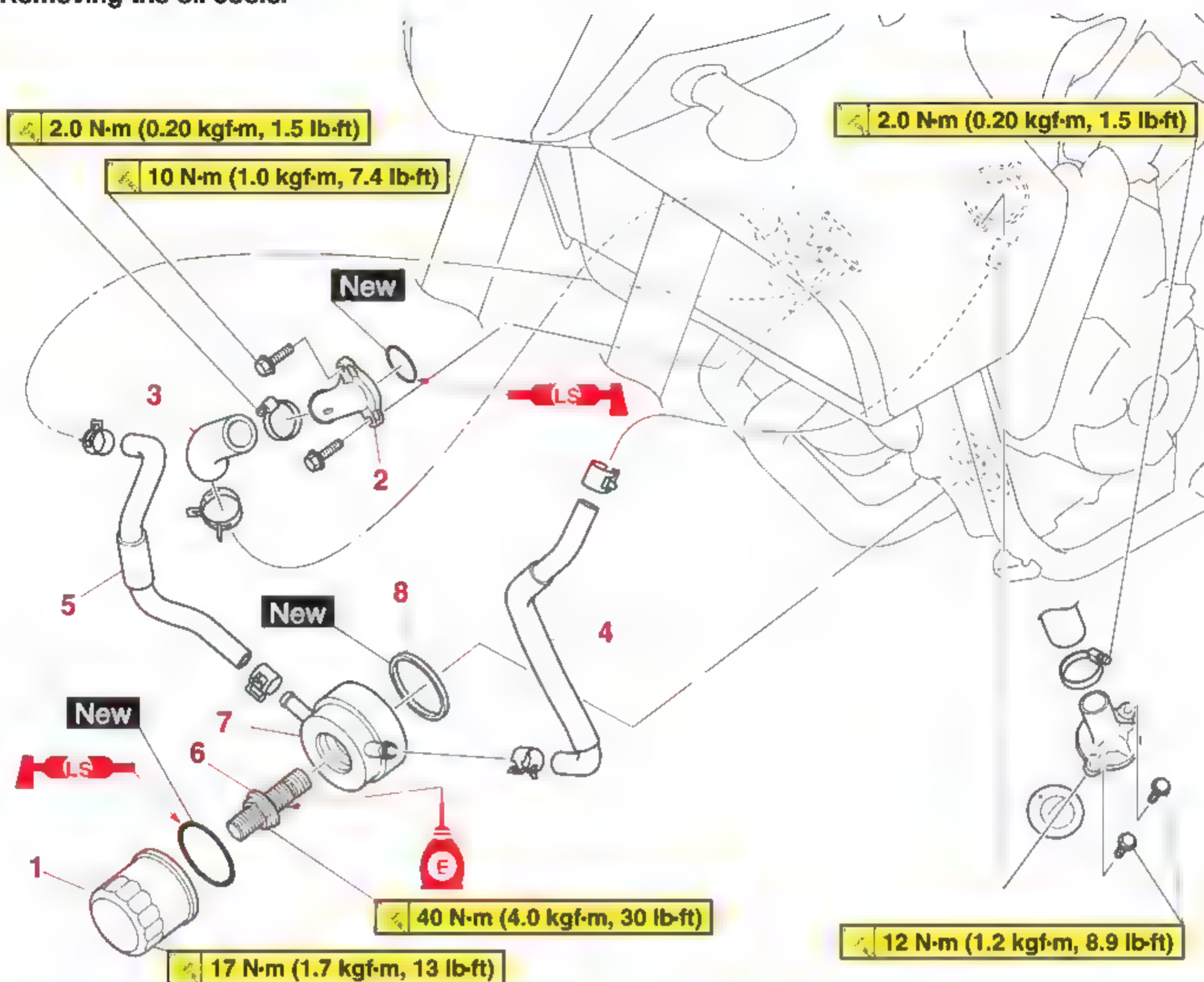
Cooling system leak test pressure

137.3 kPa (1.37 kgf/cm², 19.9 psi)

EAS20064

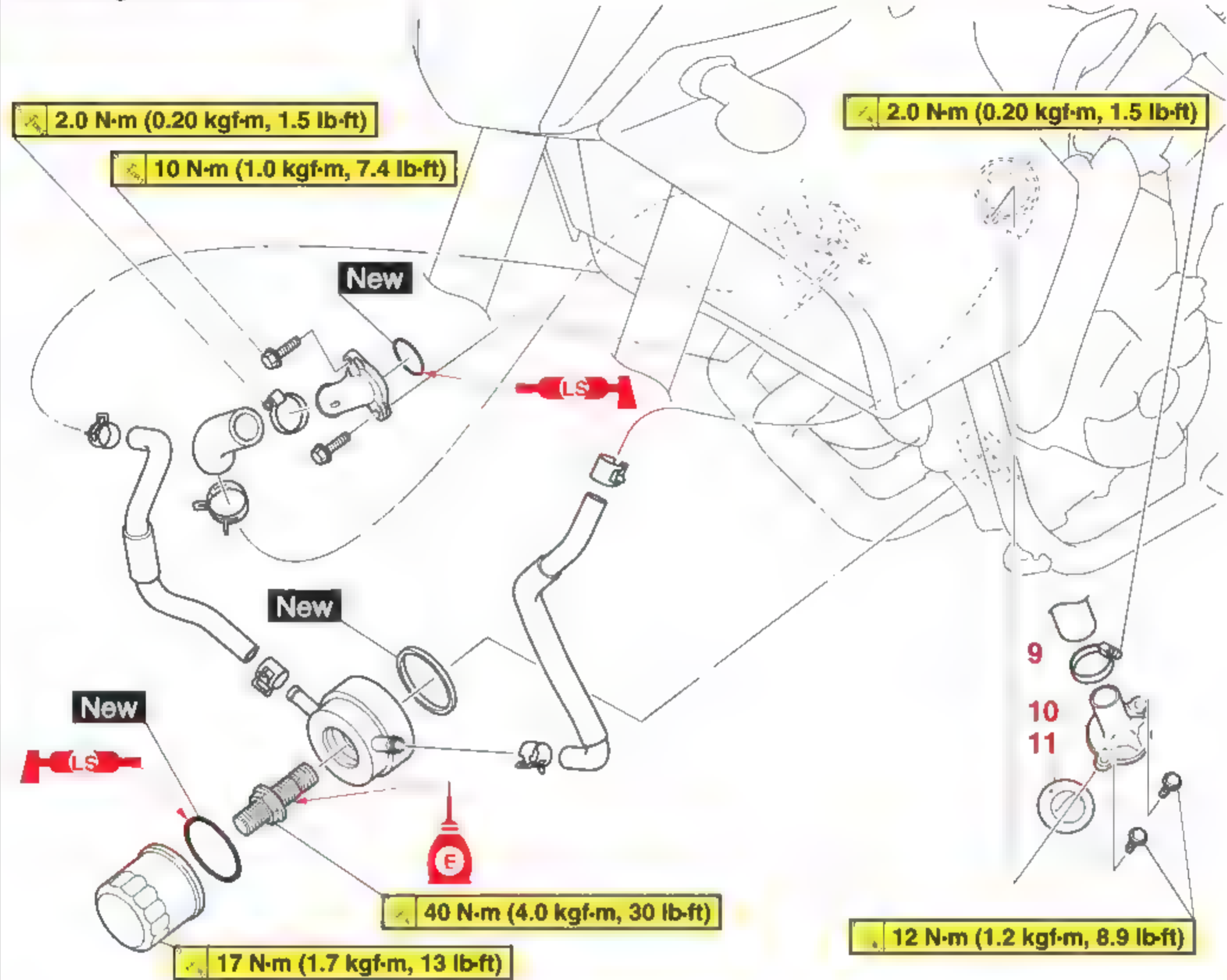
OIL COOLER

Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-28.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25.
1	Oil filter cartridge	1	
2	Water jacket joint	1	
3	Water jacket joint inlet hose	1	
4	Oil cooler inlet hose	1	
5	Oil cooler outlet hose	1	
6	Oil filter cartridge union bolt	1	
7	Oil cooler	1	
8	Gasket	1	

Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
9	Radiator inlet hose	1	Disconnect.
10	Thermostat cover	1	
11	Thermostat	1	

EAS30441

CHECKING THE OIL COOLER

1. Check:
 - Oil cooler
Cracks/damage → Replace.
2. Check:
 - Oil cooler inlet hose
 - Oil cooler outlet hose
 - Water pump outlet hose
Cracks/damage → Replace.

EAS31123

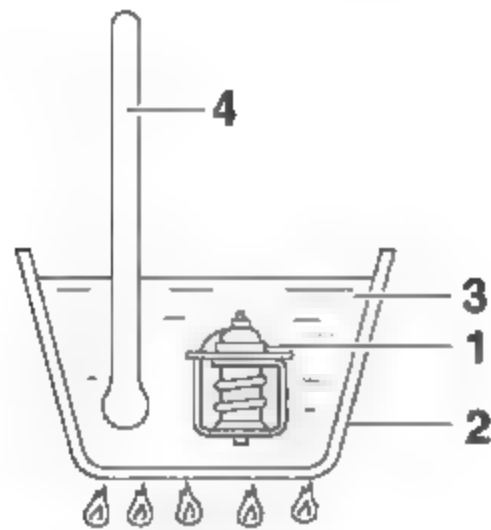
CHECKING THE WATER JACKET JOINT

1. Check:
 - Water jacket joint
Mineral deposits/rust → Eliminate.

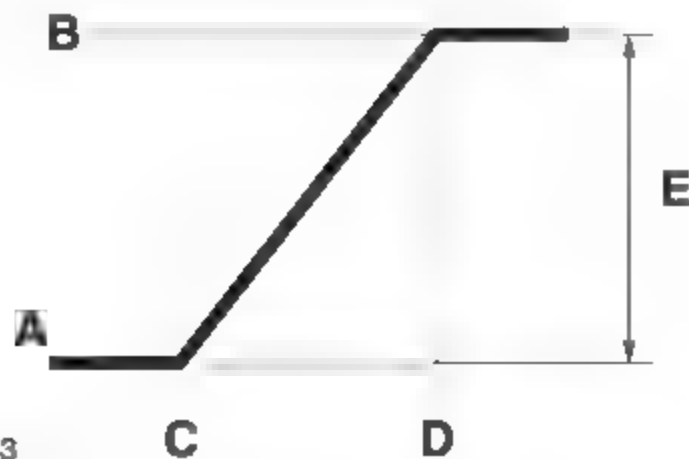
EAS30443

CHECKING THE THERMOSTAT

1. Check:
 - Thermostat
Does not open at 80–84 °C (176–183.2 °F) → Replace.
- a. Suspend the thermostat “1” in a container “2” filled with water.
- b. Slowly heat the water “3”.
- c. Place a thermometer “4” in the water.
- d. While stirring the water, observe the thermostat and thermometer’s indicated temperature.



G089032



G089033

- A. Fully closed
- B. Fully open
- C. 80 °C (176 °F)
- D. 95 °C (203 °F)
- E. 8 mm (0.31 in)

TIP

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

2. Check:
 - Thermostat cover
Cracks/damage → Replace.

EAS30442

INSTALLING THE OIL COOLER

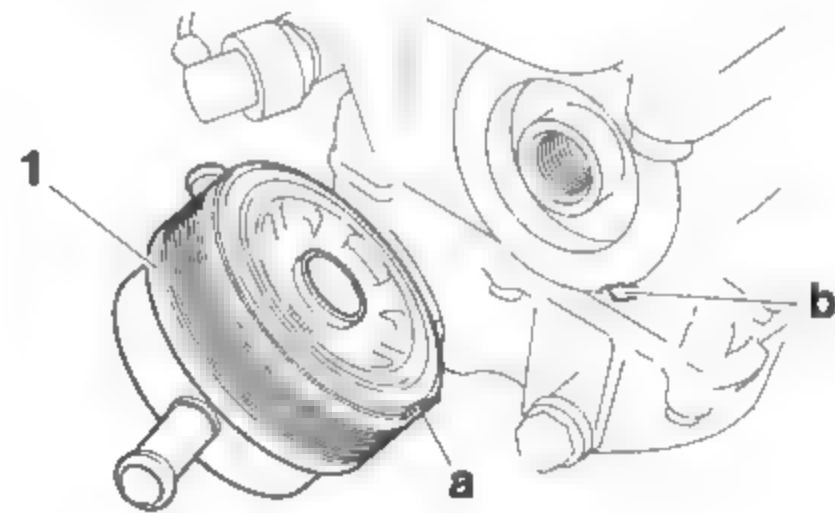
1. Clean:
 - Mating surfaces of the oil cooler and the crankcase
(with a cloth dampened with lacquer thinner)
2. Install:
 - Gasket **New**
 - Oil cooler “1”
 - Oil filter cartridge union bolt



**Oil filter cartridge union bolt
40 N·m (4.0 kgf·m, 30 lb·ft)**

TIP

- Before installing the oil cooler, apply engine oil lightly to the oil filter cartridge union bolt.
- Align the projection “a” on the oil cooler with the slot “b” in the crankcase.



3. Fill:
 - Cooling system
(with the specified amount of the recommended coolant)
Refer to “CHANGING THE COOLANT” on page 3-28.
 - Crankcase
(with the specified amount of the recommended engine oil)
Refer to “CHANGING THE ENGINE OIL” on page 3-25.
4. Check:
 - Cooling system
Leaks → Repair or replace any faulty part.

Refer to "INSTALLING THE RADIATOR" on page 6-4.

5. Measure:

- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to "CHECKING THE RADIATOR" on page 6-4.

EAS30839

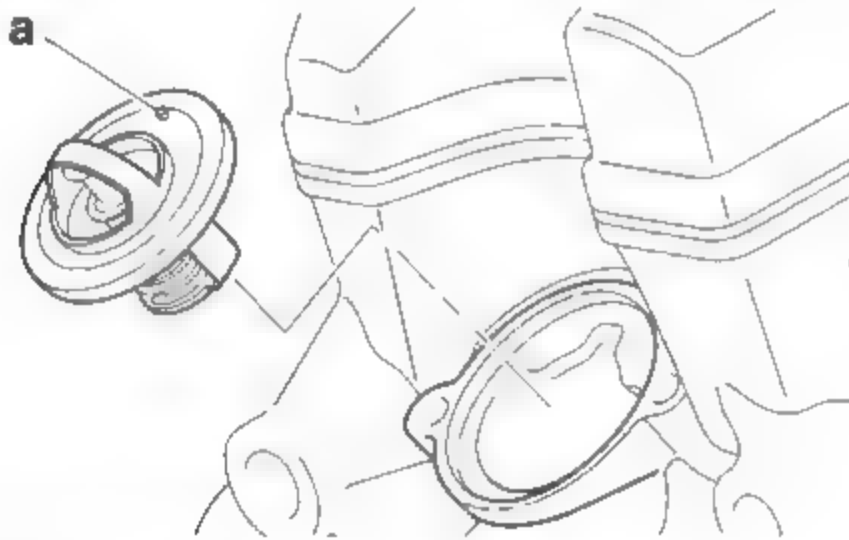
INSTALLING THE THERMOSTAT

1. Install:

- Thermostat

TIP

Install the thermostat with its breather valve "a" facing inward.



2. Fill:

- Cooling system
(with the specified amount of the recommended coolant)
Refer to "CHANGING THE COOLANT" on page 3-28.

3. Check:

- Cooling system
Leaks → Repair or replace any faulty part.

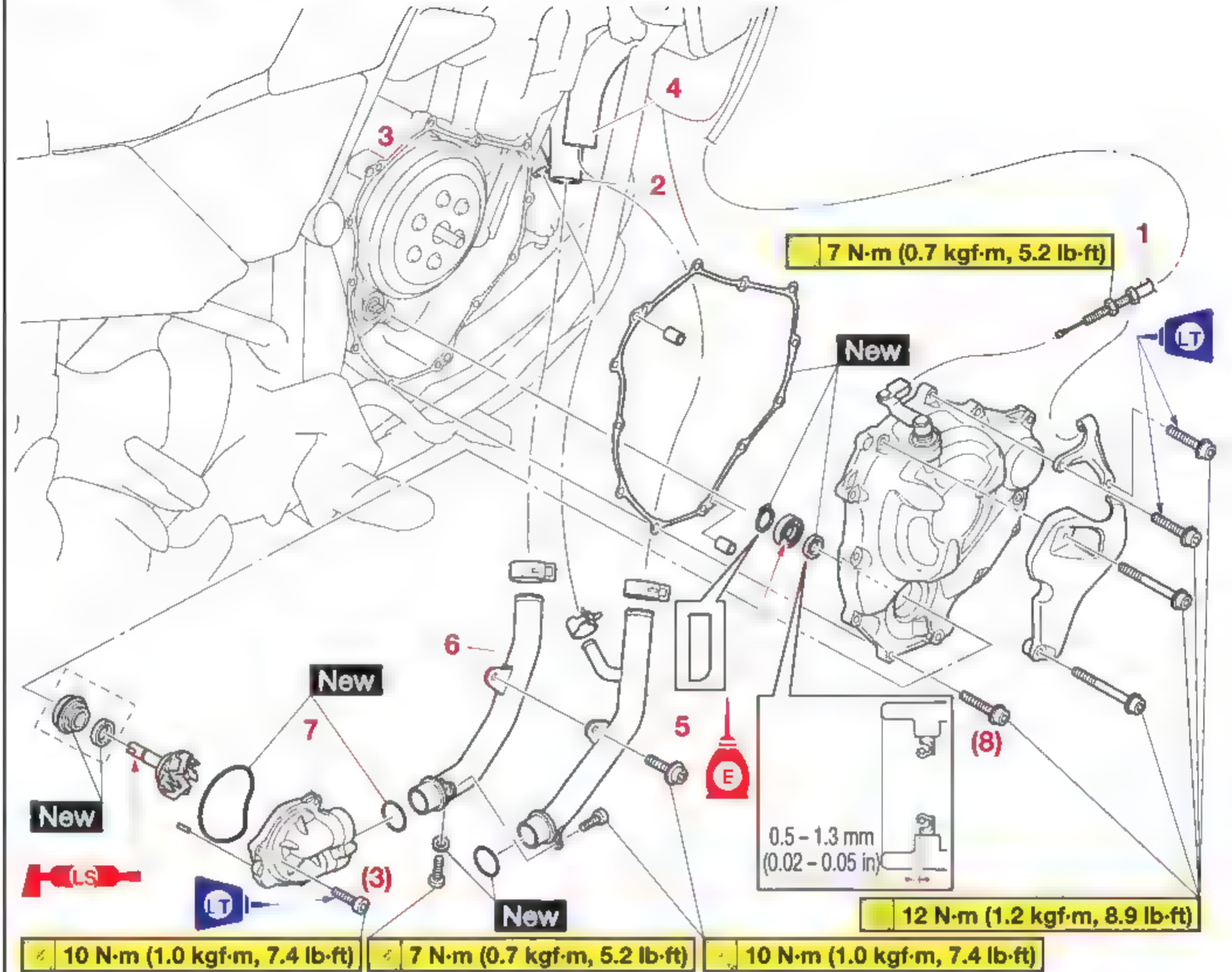
4. Measure:

- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to "CHECKING THE RADIATOR" on page 6-4.

EAS20066

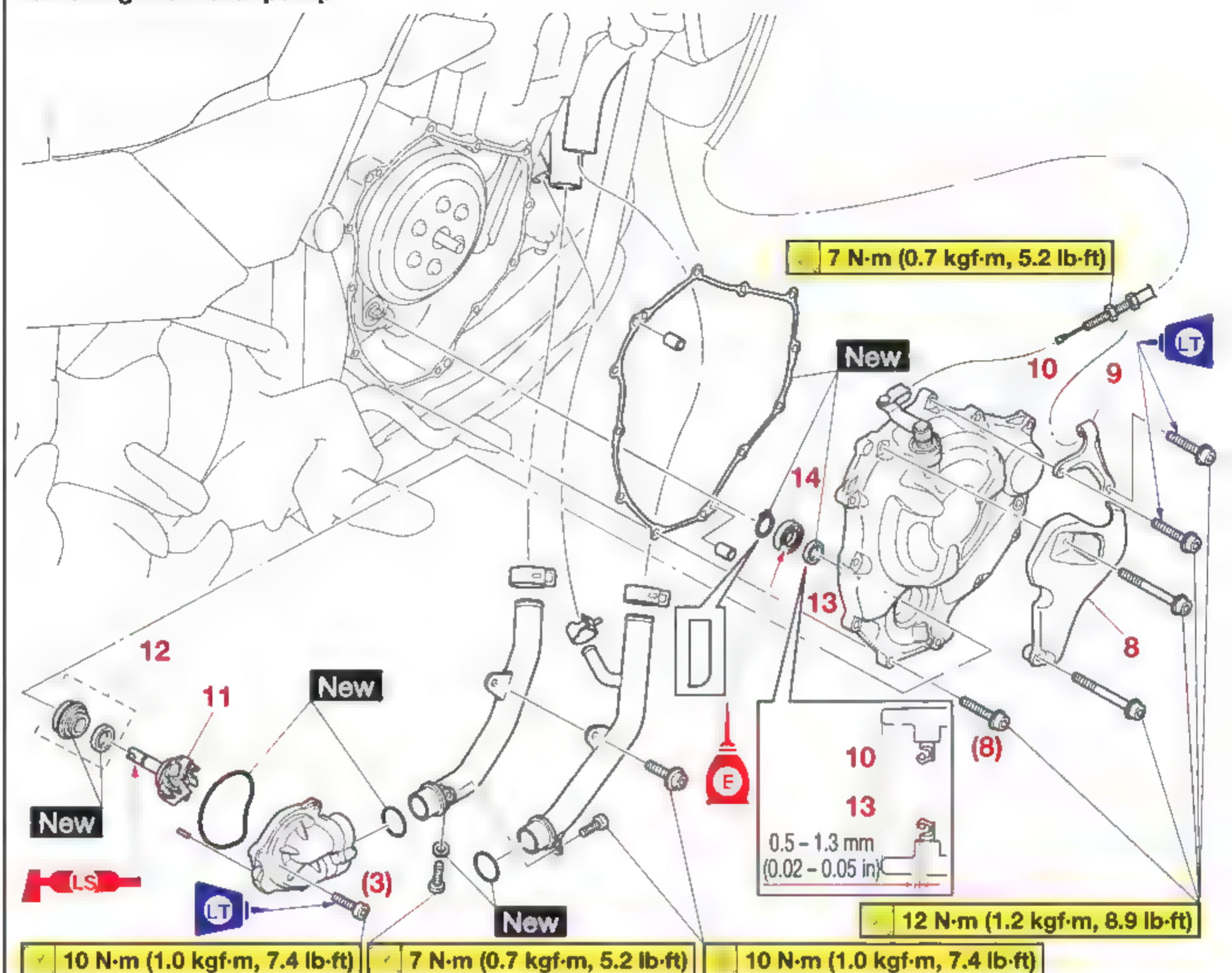
WATER PUMP

Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-28.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25.
1	Clutch cable	1	Disconnect.
2	Water pump outlet hose	1	Disconnect.
3	Oil cooler outlet hose	1	Disconnect.
4	Radiator outlet hose	1	Disconnect.
5	Water pump inlet pipe	1	
6	Water pump outlet pipe	1	
7	Water pump housing	1	

Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
8	Dust cover	1	
9	Clutch cable holder	1	
10	Clutch cover	1	
11	Impeller shaft	1	
12	Water pump seal assembly	1	
13	Oil seal	1	
14	Bearing	1	

EAS30446

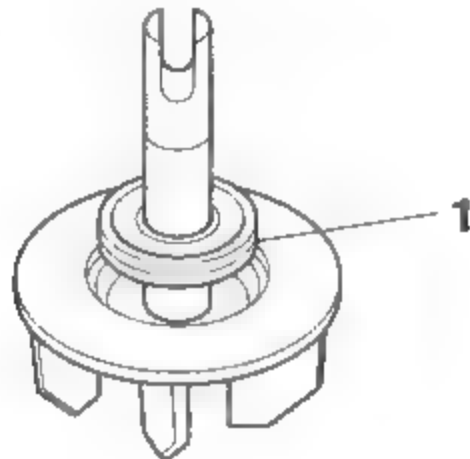
DISASSEMBLING THE WATER PUMP

1. Remove:

- Mechanical seal (impeller side) "1"
(from the impeller, with a thin, flat-head screwdriver)

TIP

Do not scratch the impeller shaft.



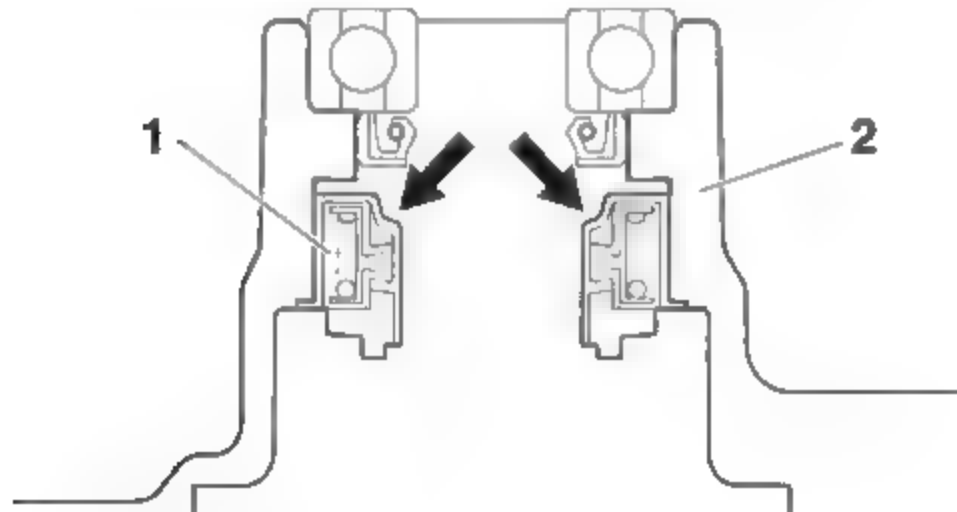
G089034

2. Remove:

- Mechanical seal (housing side) "1"

TIP

Remove the mechanical seal (housing side) from the inside of the clutch cover "2".

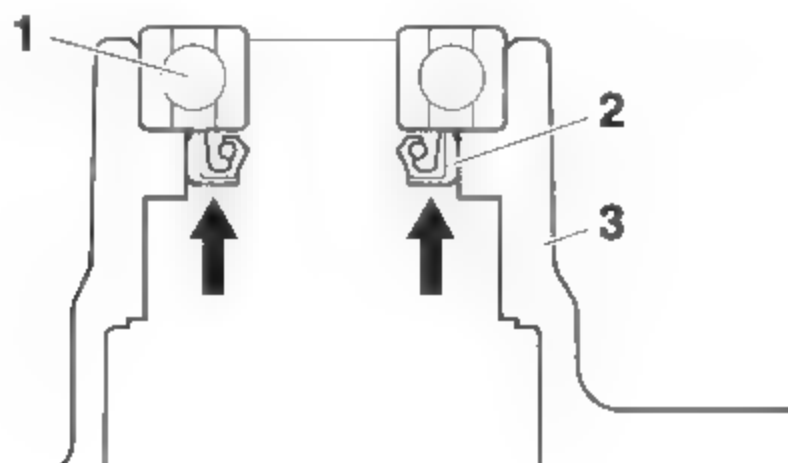


3. Remove:

- Bearing "1"
- Oil seal "2"

TIP

Remove the bearing and oil seal from the outside of the clutch cover "3".



EAS30447

CHECKING THE WATER PUMP

1. Check:

- Water pump housing
 - Clutch cover
 - Impeller shaft
- Cracks/damage/wear → Replace.

2. Check:

- Bearing
- Rough movement → Replace.

3. Check:

- Water pump outlet pipe
 - Water pump inlet pipe
- Cracks/damage/wear → Replace.

EAS30448

ASSEMBLING THE WATER PUMP

1. Install:

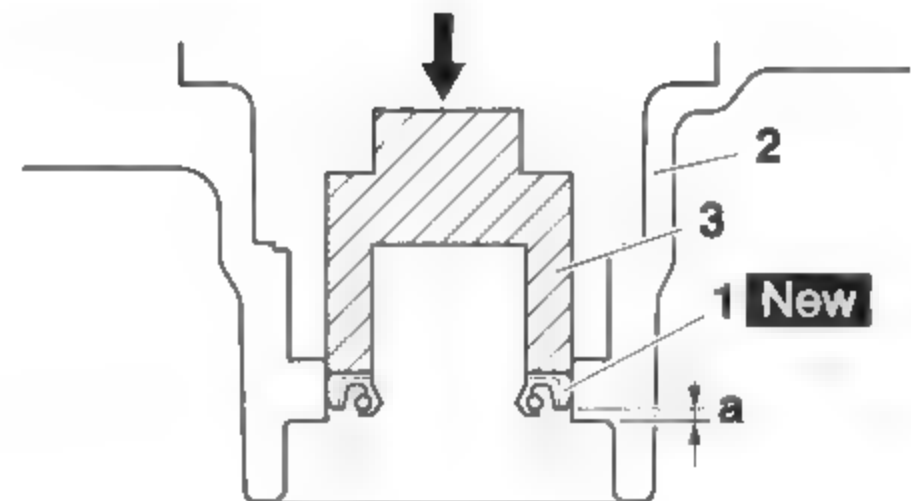
- Oil seal "1" **New**
 - Bearing
- (into the clutch cover "2")

TIP

Install the oil seal with a socket "3" that matches its outside diameter.



Installed depth of oil seal "a"
0.5–1.0 mm (0.02–0.04 in)



2. Install:

- Mechanical seal (housing side) "1" **New**
- (into the clutch cover "2")

ECA20330

NOTICE

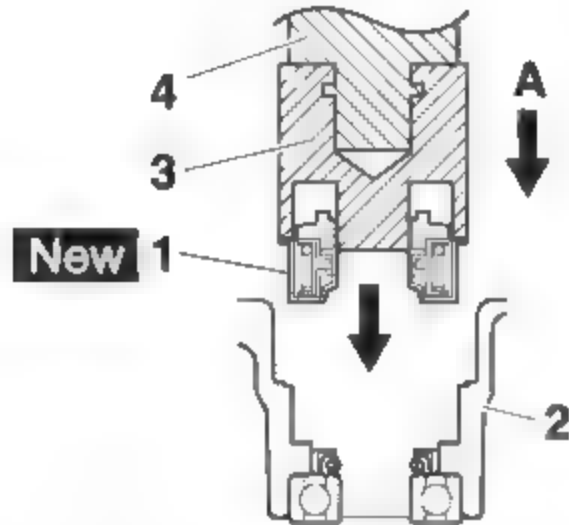
Never lubricate the mechanical seal (housing side) surface with oil or grease.

TIP

Use the special tools and a press to press the mechanical seal (housing side) straight in until it touches the clutch cover.



Mechanical seal installer (ø33)
90890-04132
Water pump seal installer (ø33)
YM-33221-A
Middle driven shaft bearing driver
90890-04058
Middle drive bearing installer 40
& 50 mm
YM-04058



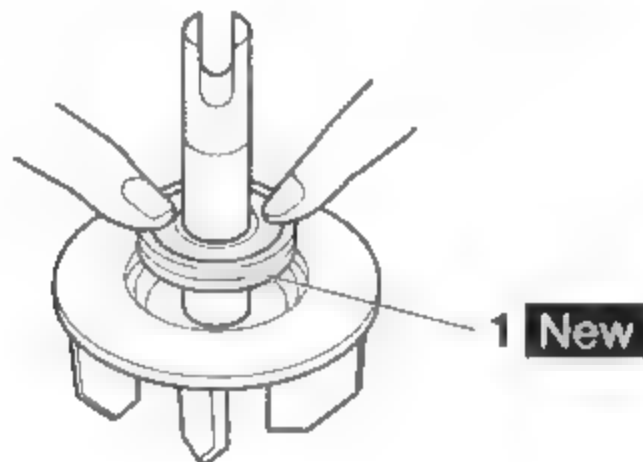
- 3. Mechanical seal installer
- 4. Middle driven shaft bearing driver
- A. Push down

3. Install:

- Mechanical seal (impeller side) "1" **New**

TIP

Before installing the mechanical seal (impeller side), apply tap water or coolant onto its outer surface.



G089035

4. Measure:

- Mechanical seal (impeller side)
- Out of specification → Repeat steps (3) and (4).

ECA14090

NOTICE

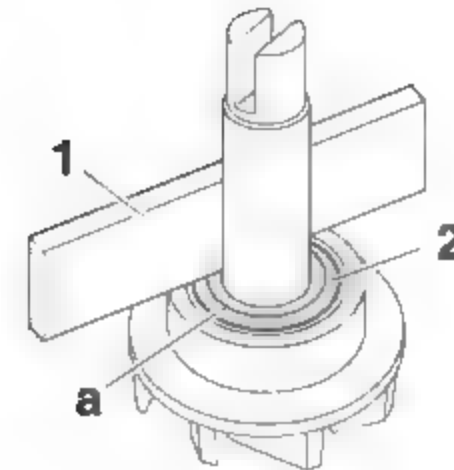
Make sure the rubber damper and rubber damper holder are flush with the impeller.

TIP

If the surface "a" of the mechanical seal (impeller side) that contacts the mechanical seal (housing side) is dirty, clean it.



Mechanical seal (impeller side)
0.15 mm (0.006 in)



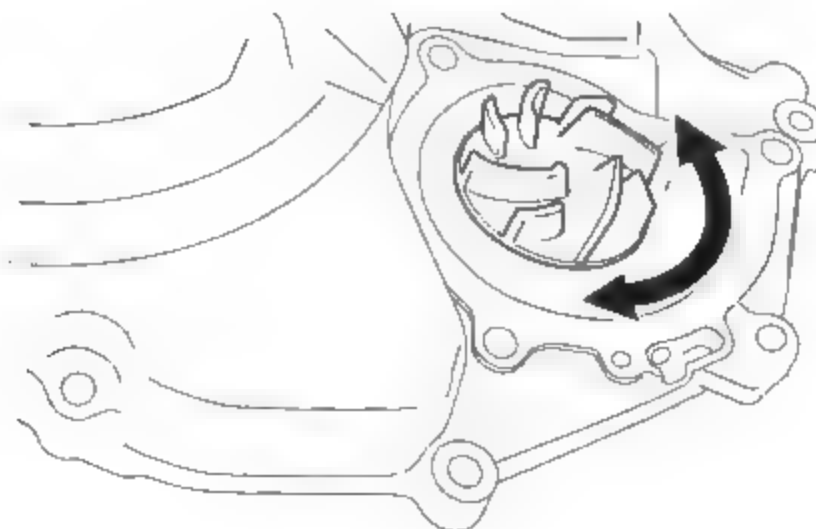
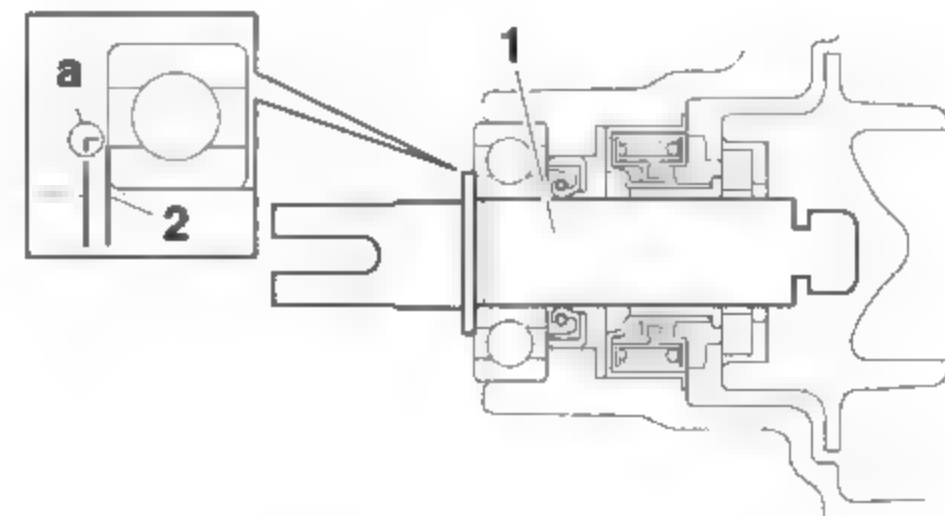
- 1. Straightedge
- 2. Impeller

5. Install:

- Impeller shaft "1"
- Circlip "2"

TIP

- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the bearing.
- After installation, check that the impeller shaft rotates smoothly.



EAS31117

INSTALLING THE CLUTCH COVER

1. Install:

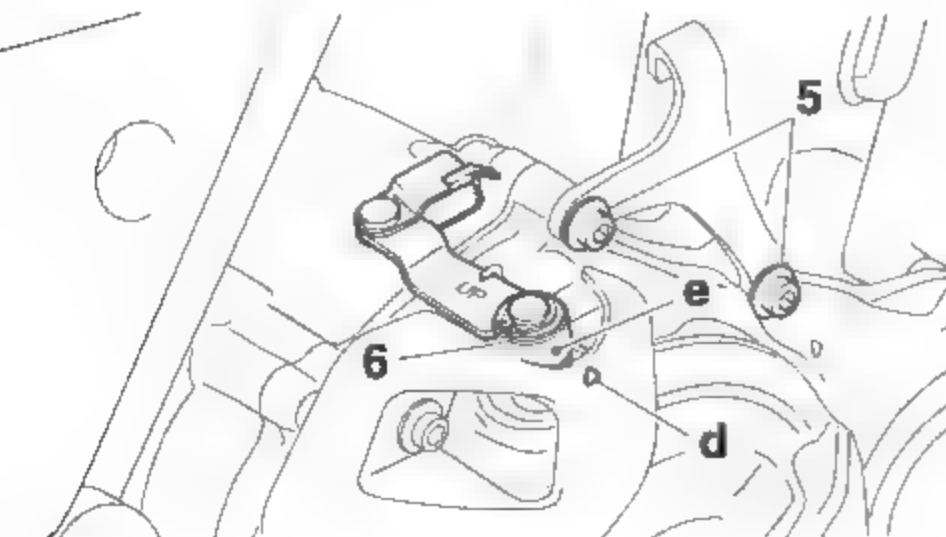
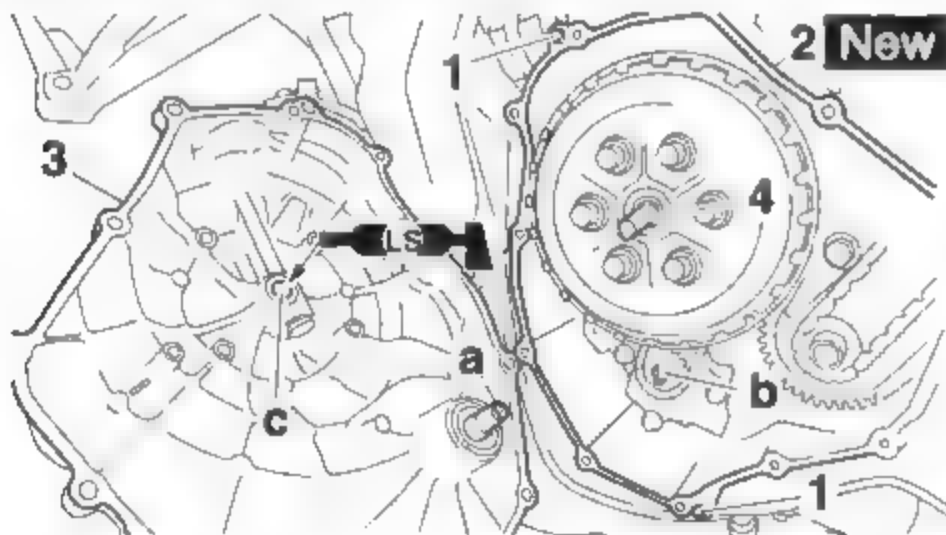
- Dowel pins "1"
- Clutch cover gasket "2" **New**
- Clutch cover "3"



Clutch cover bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)
Clutch cable holder bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®

TIP

- Align the slit "a" in the impeller shaft with the projection "b" on the oil pump driven sprocket.
- Face the serrations on the clutch pull rod "4" rearward and align the rod with the hole "c" in the clutch cover.
- Apply locking agent (LOCTITE®) to the threads of only the clutch cable holder bolts "5".
- Tighten the bolts in stages and in a crisscross pattern.
- After installing the clutch cover, make sure that the alignment mark "d" on the clutch cover is aligned with the punch mark "e" on the pull lever "6".



2. Fill:

- Cooling system
(with the specified amount of the recommended coolant)

Refer to "CHANGING THE COOLANT" on page 3-28.

3. Check:

- Cooling system
Leaks → Repair or replace the faulty part.

4. Measure:

- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to "CHECKING THE RADIATOR" on page 6-4.

5. Adjust:

- Clutch lever free play
Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-13.

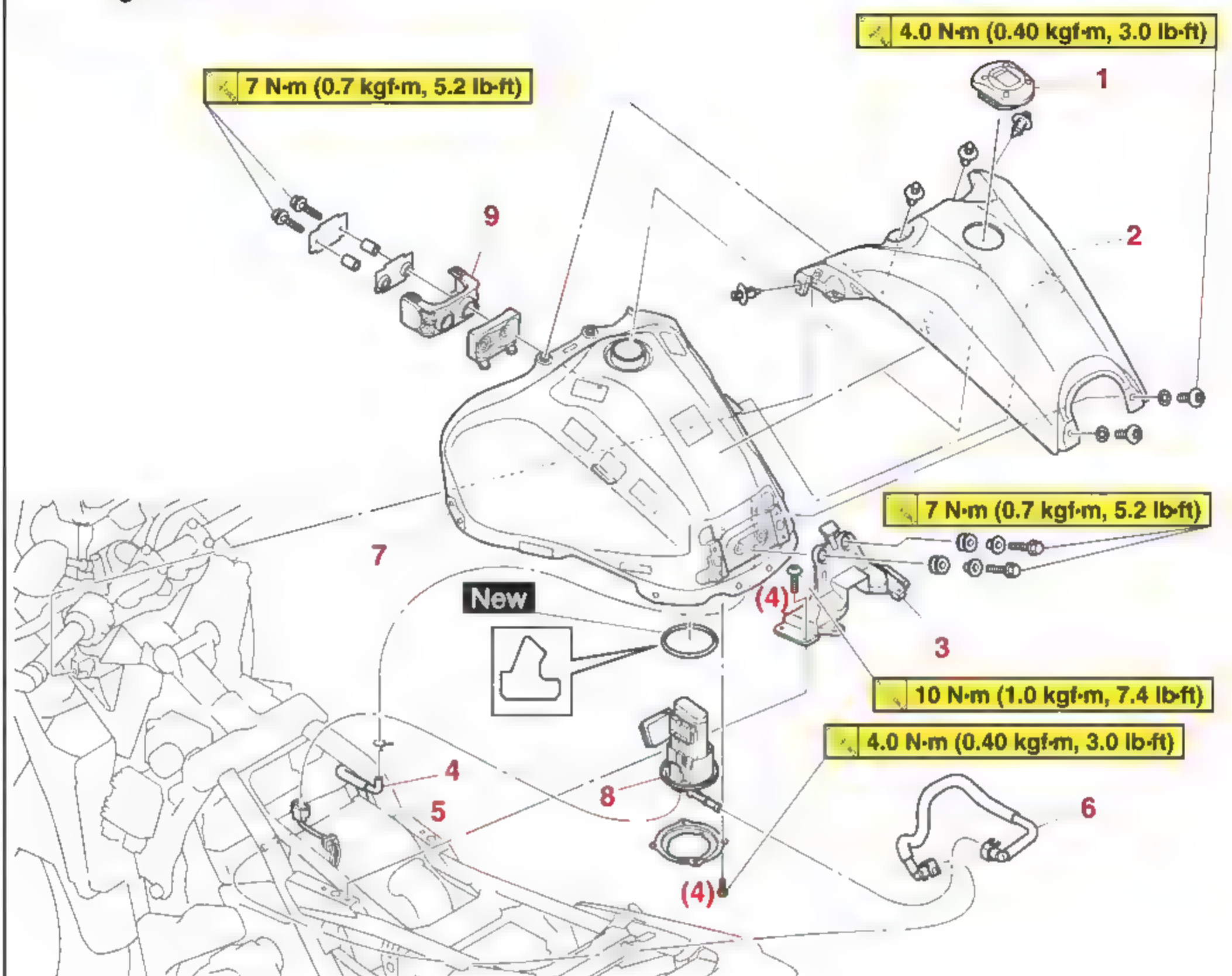
FUEL SYSTEM

FUEL TANK	7-1
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REMOVING THE FUEL TANK	7-3
REMOVING THE FUEL PUMP	7-3
CHECKING THE FUEL PUMP BODY	7-3
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CHECKING THE ROLLOVER VALVE	7-3
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EAS20067

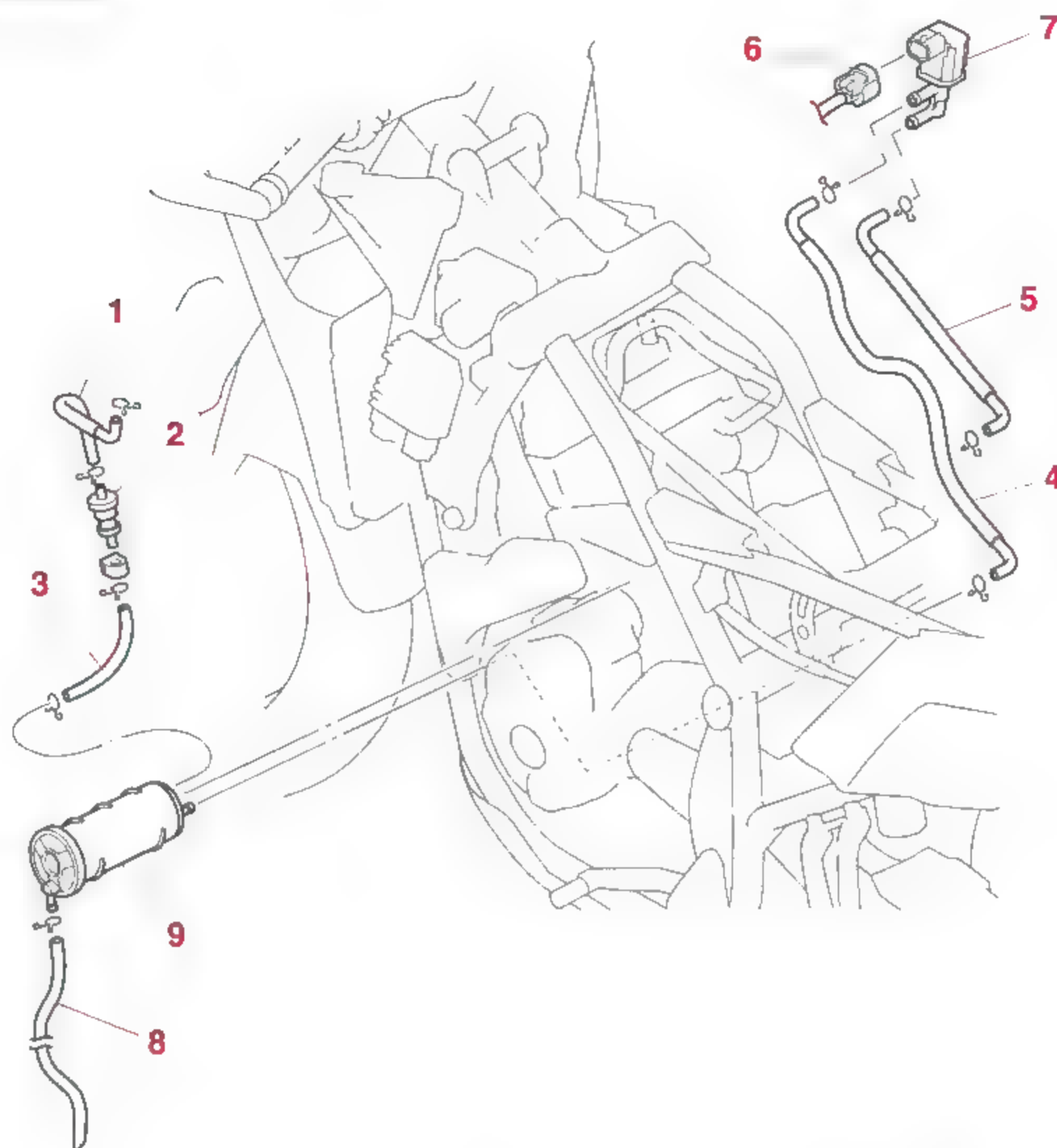
FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoops/Air ducts/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
1	Fuel tank cap	1	
2	Fuel tank cover	1	
3	Fuel tank mounting bracket (rear side)	1	
4	Fuel tank breather/overflow hose	1	Disconnect.
5	Fuel pump coupler	1	Disconnect.
6	Fuel hose	1	
7	Fuel tank	1	
8	Fuel pump	1	
9	Fuel tank mounting bracket (front side)	1	

Removing the canister



Order	Job/Parts to remove	Q'ty	Remarks
	Windshield (right)		Refer to "GENERAL CHASSIS (4)" on page 4-8.
	Windshield inner panel (right)		Refer to "GENERAL CHASSIS (5)" on page 4-10.
	Fuel tank		Refer to "Removing the fuel tank" on page 7-1.
1	Fuel tank breather/overflow hose (fuel tank to rollover valve)	1	
2	Rollover valve	1	
3	Fuel tank breather/overflow hose (rollover valve to canister)	1	
4	Canister purge hose (purge cut valve solenoid to canister)	1	
5	Canister purge hose (purge cut valve solenoid to throttle body)	1	
6	Purge cut valve solenoid coupler	1	Disconnect.
7	Purge cut valve solenoid	1	
8	Canister breather hose	1	
9	Canister	1	

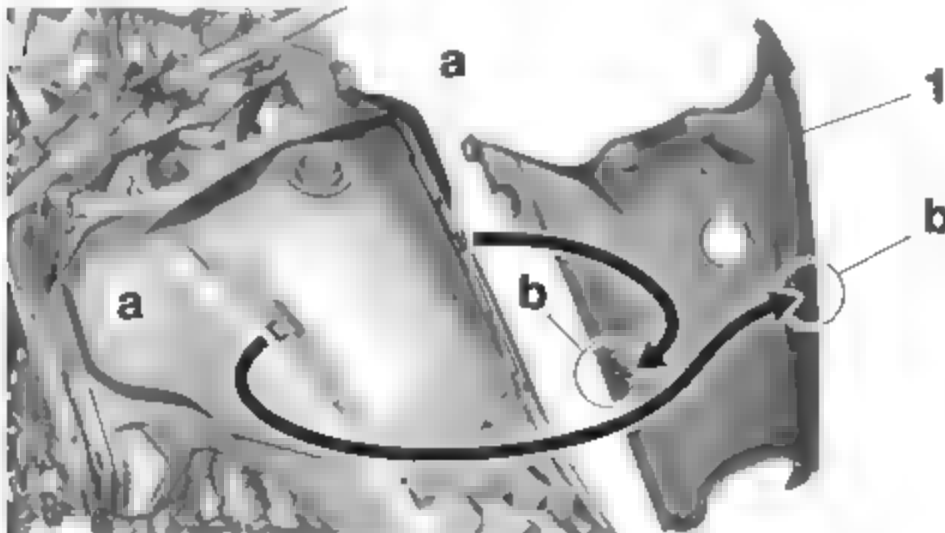
EAS30838

REMOVING THE FUEL TANK COVER

1. Remove:
 - Fuel tank cover "1"

TIP

Remove the projections "a" on the fuel tank from the projections "b" on the fuel tank cover.



EAS30450

REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
 - Fuel hose

EWA17320



WARNING
Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

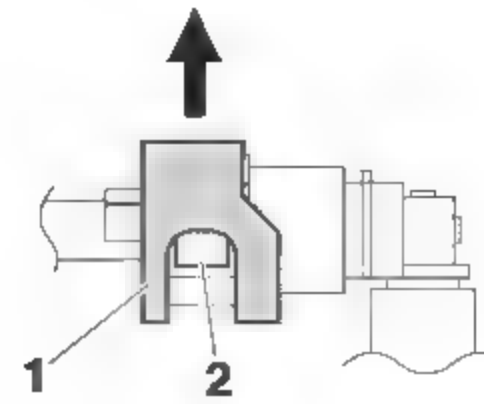
EAS30451

NOTICE

Although the fuel has been removed from the fuel tank, be careful when removing the fuel hose, since there may be fuel remaining in it.

TIP

- To remove the fuel hose from the fuel rail and fuel pump, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, press the two buttons "2" on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.



G089038

3. Remove:
 - Fuel tank

TIP

Do not set the fuel tank down on the installation surface of the fuel pump. Be sure to lean the fuel tank against a wall or the like.

EAS30451

REMOVING THE FUEL PUMP

1. Remove:
 - Fuel pump

ECA14721

NOTICE

- Do not drop the fuel pump or give it a strong shock.
- Do not touch the base section of the fuel sender.

EAS30454

CHECKING THE FUEL PUMP BODY

1. Check:
 - Fuel pump body
 - Obstruction → Clean.
 - Cracks/damage → Replace fuel pump assembly.

EAS33278

CHECKING THE CYLINDER HEAD BREATHER HOSE

1. Check:
 - Cylinder head breather hose
 - Cracks/damage → Replace.
 - Loosen connection → Connect properly.

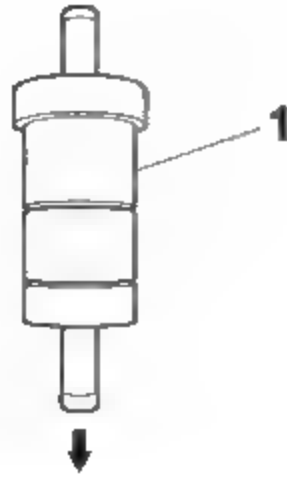
EAS30899

CHECKING THE ROLLOVER VALVE

1. Check:
 - Rollover valve "1"
 - Damage/faulty → Replace.

TIP

- Check that air flows smoothly only in the direction of the arrow shown in the illustration.
- The rollover valve must be in an upright position when checking the airflow.



EAS33542

CHECKING THE PURGE CUT VALVE SOLENOID

1. Check:
 - Canister purge hose
Loose connection → Connect properly.
Cracks/damage/wear → Replace.
2. Check:
 - Purge cut valve solenoid resistance
Refer to "CHECKING THE PURGE CUT VALVE SOLENOID" on page 8-48.

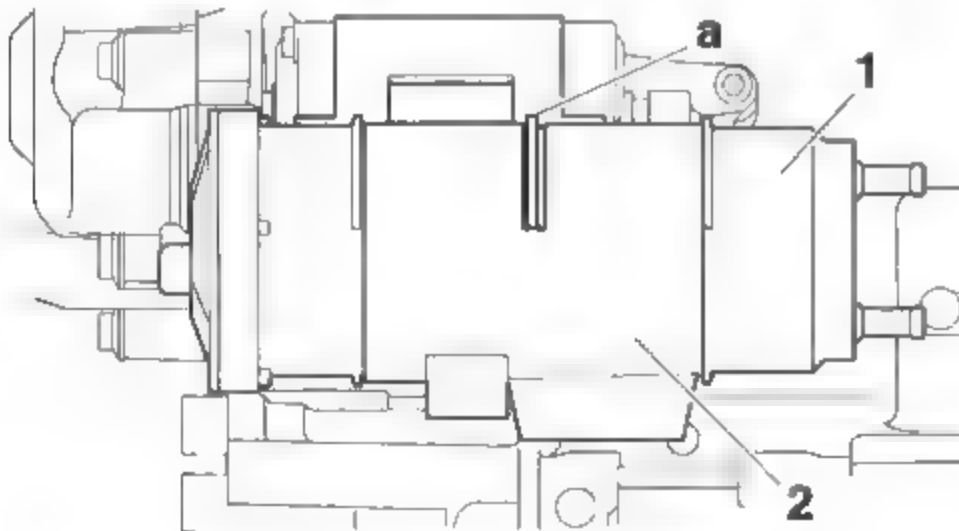
EAS31330

INSTALLING THE CANISTER

1. Install:
 - Canister "1"

TIP

Fit the projection "a" on the canister into the slot in the canister holder "2".



EAS30456

INSTALLING THE FUEL PUMP

1. Install:
 - Fuel pump gasket "1" **New**
 - Fuel pump
 - Fuel pump bracket

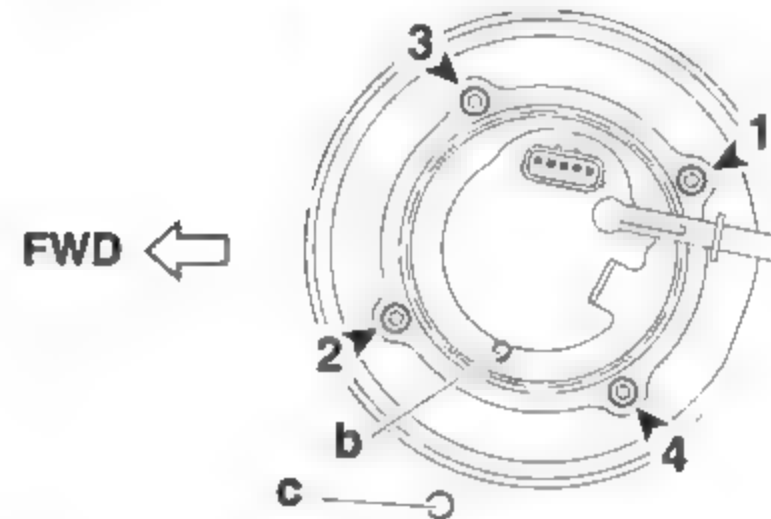
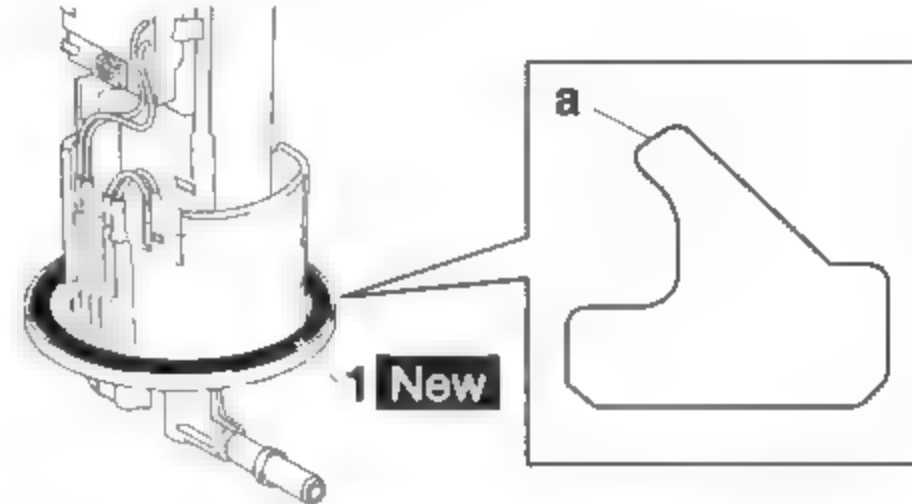


Fuel pump bolt
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)

TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.

- The gasket lip "a" shall face toward the fuel tank.
- Align the projection "b" on the fuel pump with the punch mark "c" on the fuel tank.
- Align the slot in the fuel pump bracket with the projection "b" on the fuel pump.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



EAS30457

INSTALLING THE FUEL TANK

1. Install:
 - Fuel hose

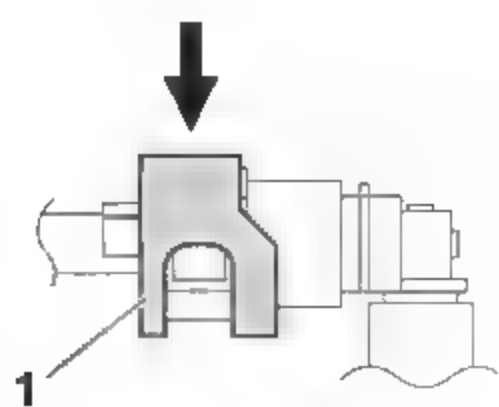
ECA18420

NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position; otherwise, the fuel hose will not be properly installed.

TIP

- Install the fuel hose securely onto the fuel rail and fuel pump until a distinct "click" is heard.
- To install the fuel hose, slide the fuel hose connector cover "1" on each end of the hose in the direction of the arrow shown.

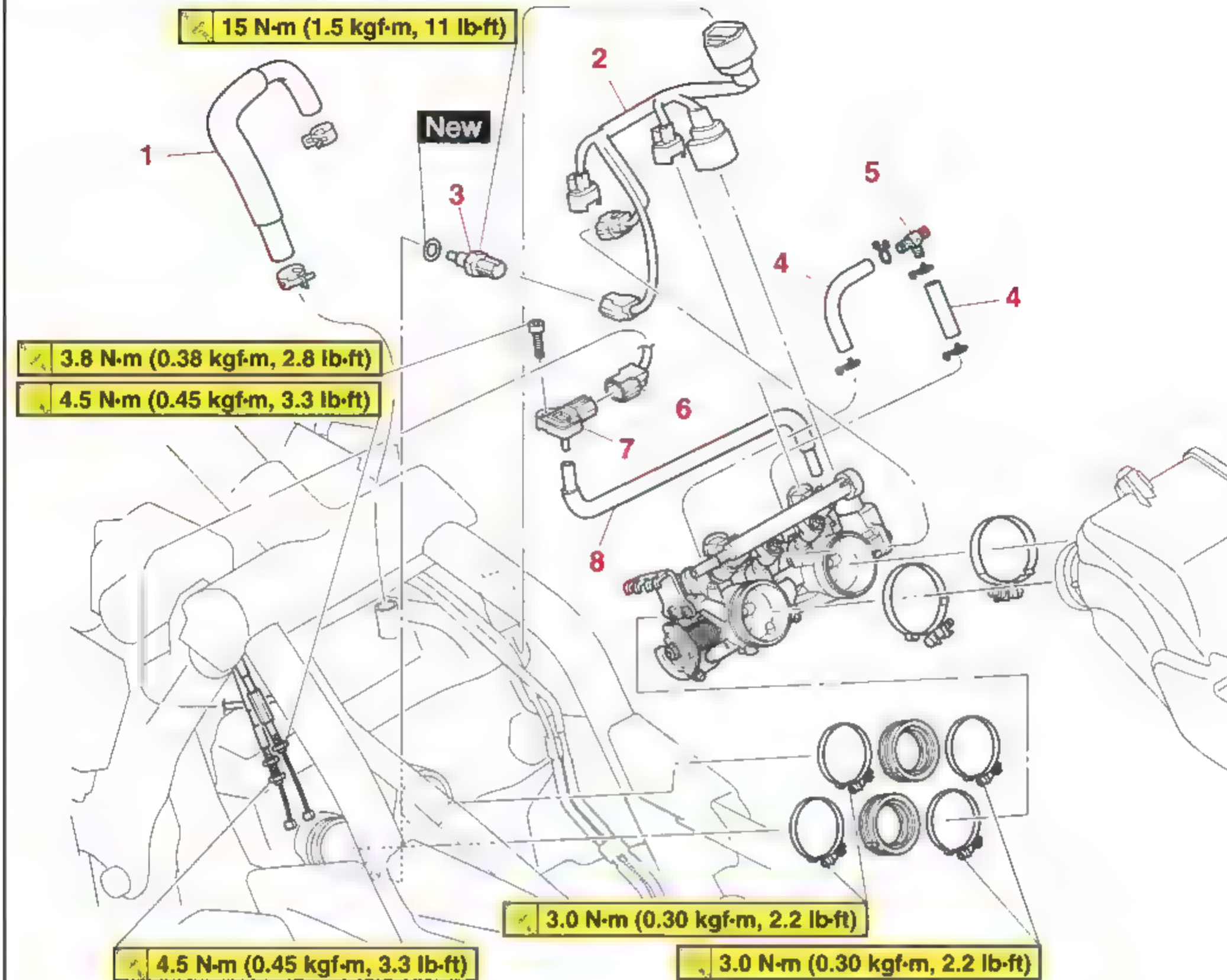


G089039

EAS20070

THROTTLE BODIES

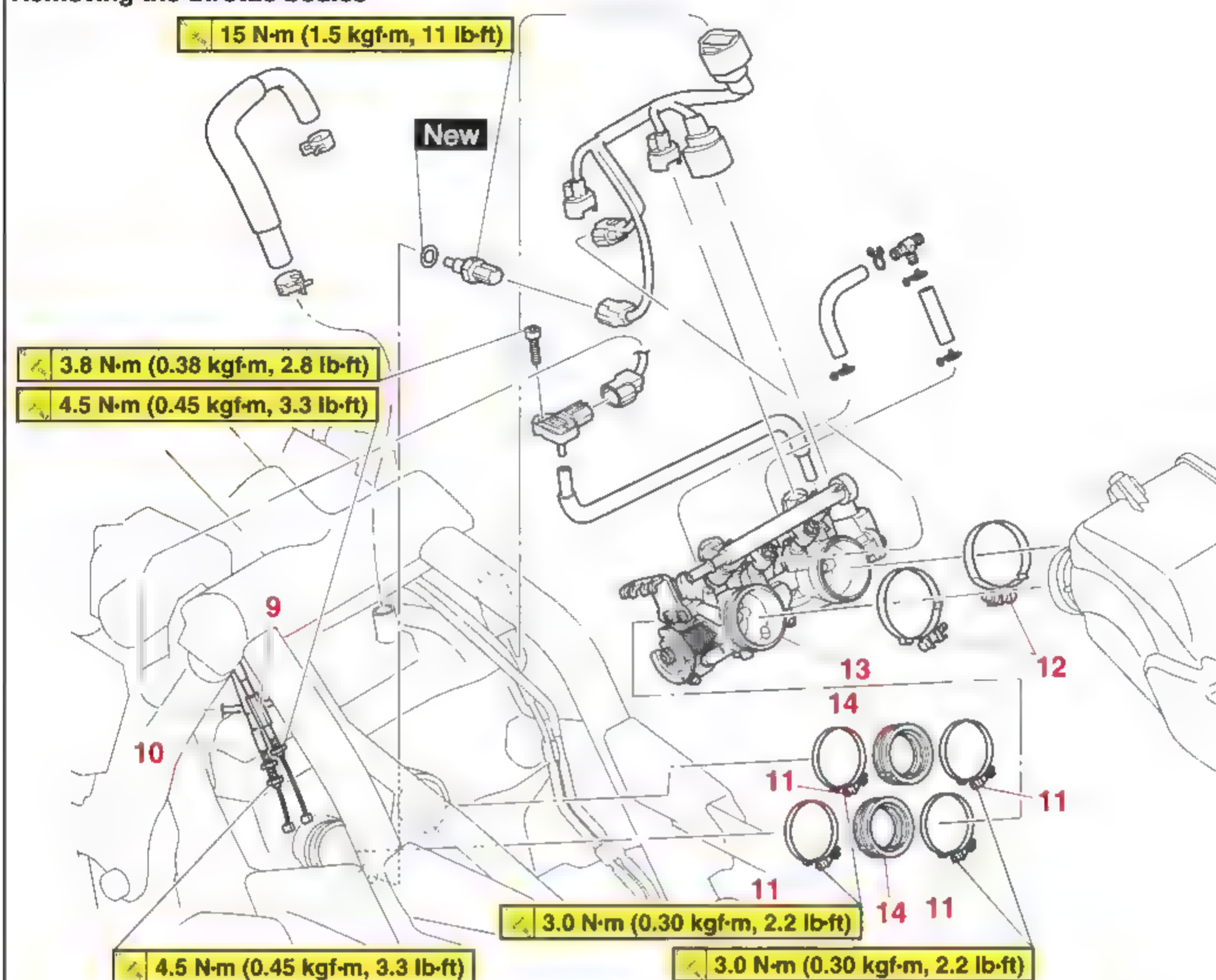
Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank/Canister		Refer to "FUEL TANK" on page 7-1.
1	Cylinder head breather hose	1	
2	Sub-wire harness	1	
3	Coolant temperature sensor	1	
4	Canister purge hose (hose joint to throttle bodies)	2	
5	Hose joint	1	
6	Intake air pressure sensor coupler	1	Disconnect.
7	Intake air pressure sensor	1	
8	Intake air pressure sensor hose	1	Disconnect.

THROTTLE BODIES

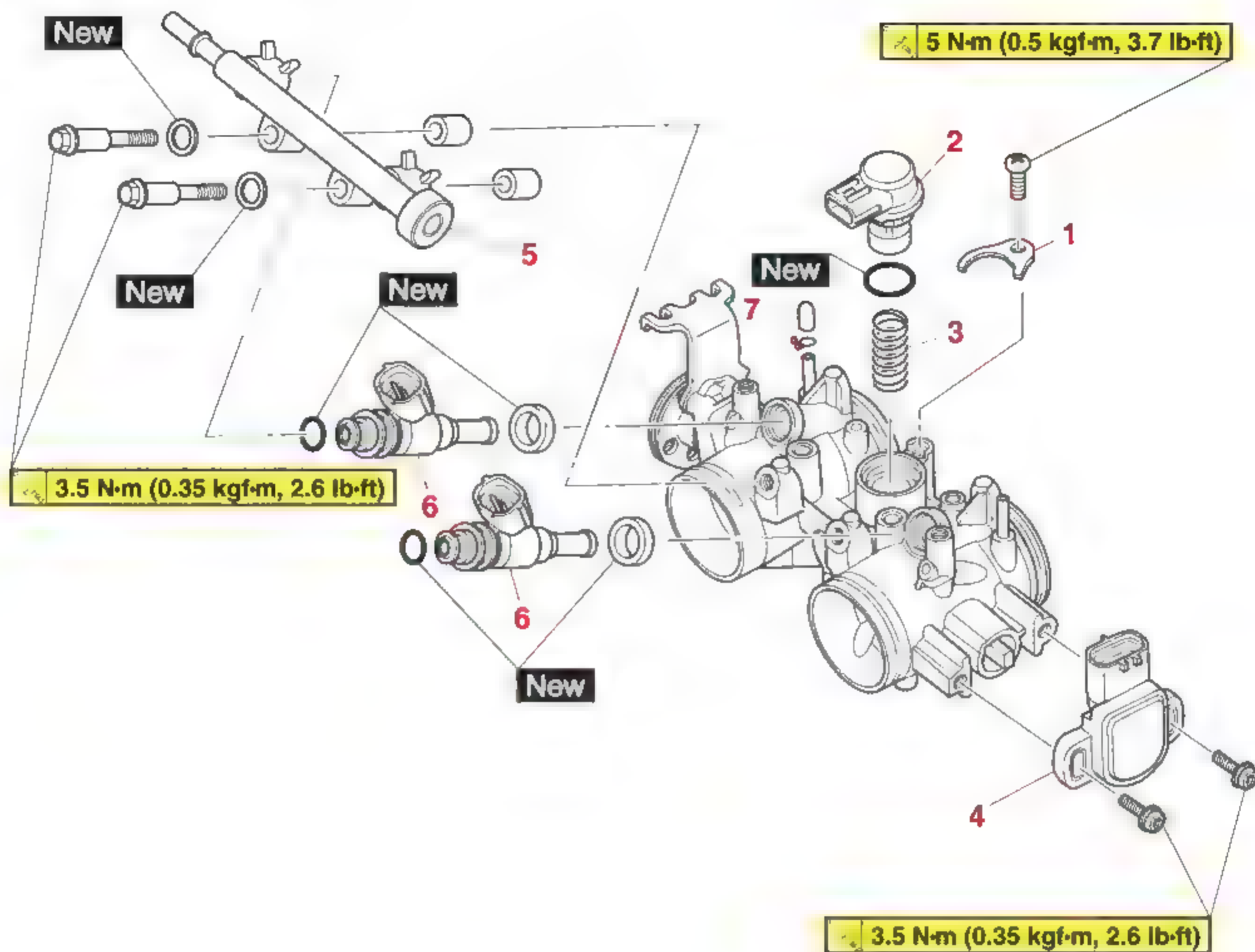
Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
9	Throttle cable (decelerator cable)	1	Disconnect.
10	Throttle cable (accelerator cable)	1	Disconnect.
11	Throttle body joint clamp screw	4	Loosen.
12	Air filter case joint clamp screw	2	Loosen.
13	Throttle bodies	1	Refer to "REMOVING THE THROTTLE BODIES" on page 7-9.
14	Throttle body joint	2	

THROTTLE BODIES

Removing the fuel injectors



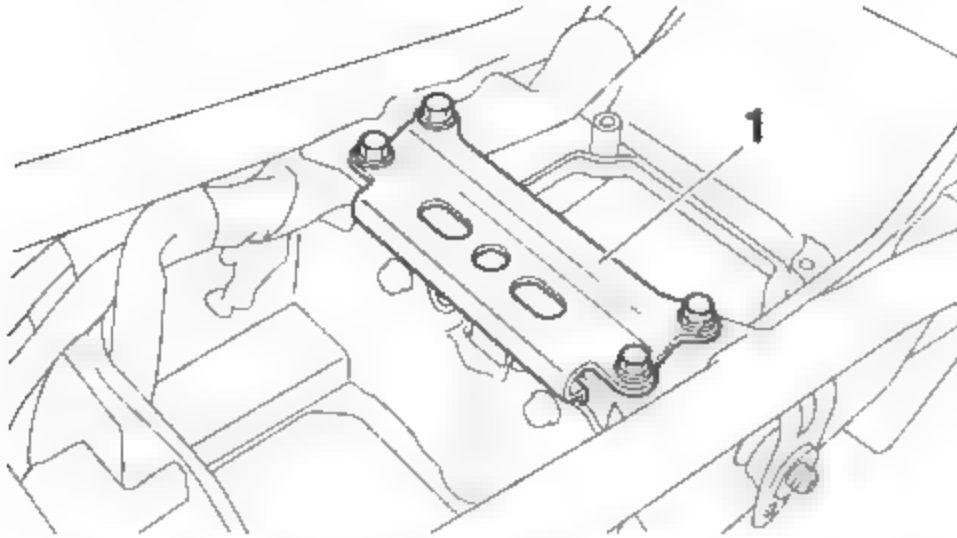
Order	Job/Parts to remove	Q'ty	Remarks
1	ISC (Idle Speed Control) valve plate	1	
2	ISC (Idle Speed Control) valve	1	
3	Spring	1	
4	Throttle position sensor	1	
5	Fuel rail	1	
6	Fuel injector	2	
7	Cap	1	

EAS30879

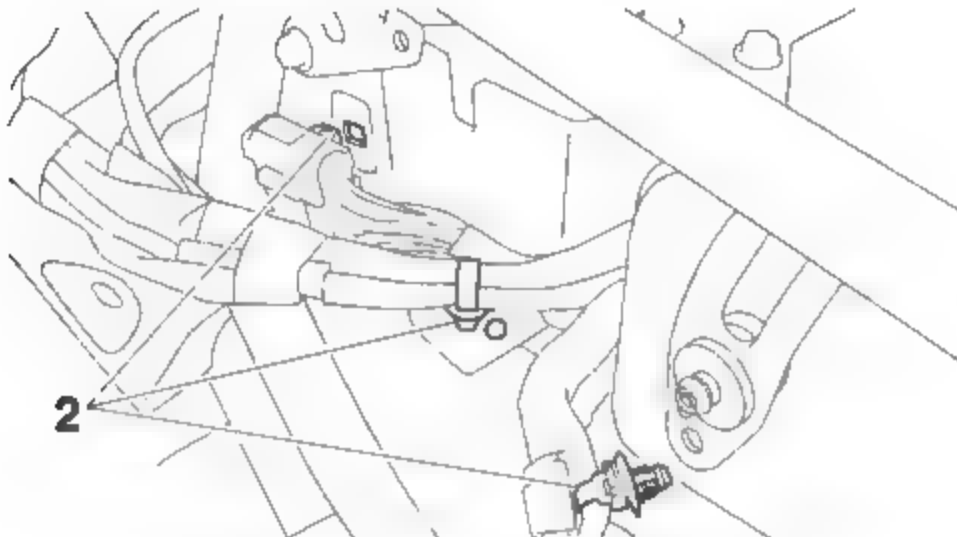
REMOVING THE THROTTLE BODIES

1. Remove:

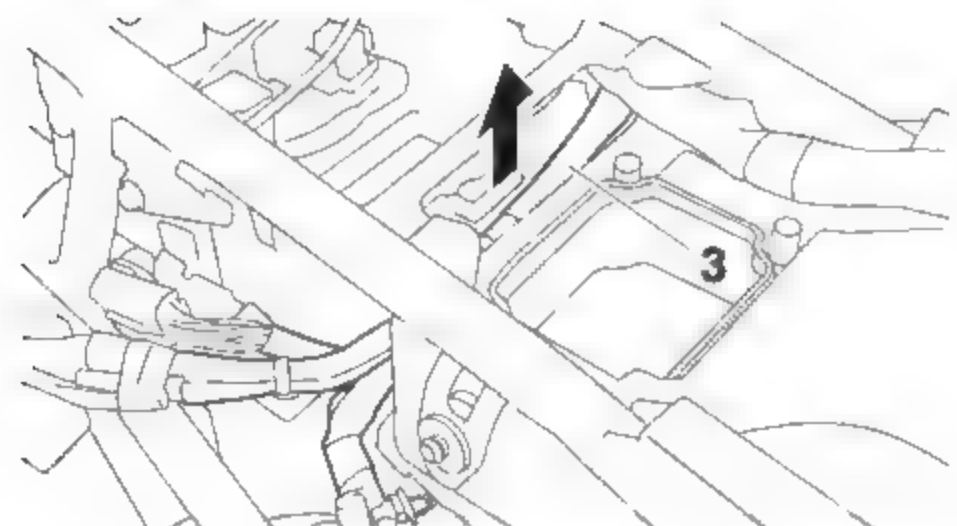
- Throttle bodies
 - a. Remove the battery box bracket "1".



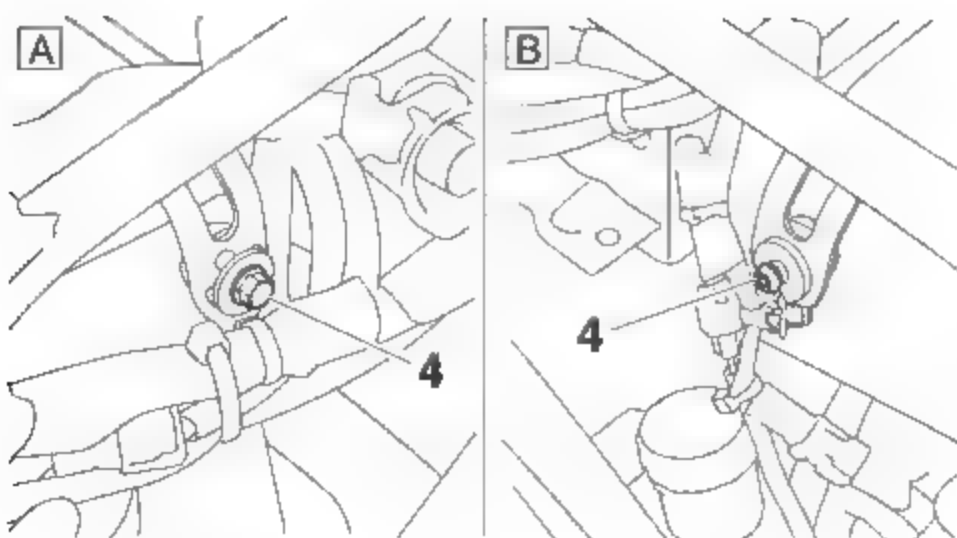
- b. Remove the holders "2" from the frame and battery box.



- c. Lift the wire harness "3" in the direction of the arrow shown.



- d. Remove the air filter case bolts (left/right) "4".



- A. Left
B. Right

- e. Pull the air filter case rearward to remove it from the throttle bodies.
- f. Remove the throttle bodies.

CHECKING THE INJECTORS (BEFORE REMOVING)

1. Check:

- Injectors
Use the diagnostic code numbers "36" and "37".
Refer to "DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE" on page 9-40.

EAS30476

REMOVING THE INJECTORS

EWA17330

⚠ WARNING

- Check the injectors in a well-ventilated area free of combustible materials. Make sure that there is no smoking or use of electric tools in the vicinity of the injectors.
- Be careful when disconnecting the fuel hose. Any remaining pressure in the fuel hose may cause the fuel to spray out. Place a container or rag under the hose to catch any fuel that spills. Always clean up any spilt fuel immediately.
- Turn the main switch to "OFF" and disconnect the negative battery lead from the battery terminal before removing the injectors.

1. Remove:

- Fuel rail

EAS30477

CHECKING THE INJECTORS

1. Check:

- Injectors
Obstruction → Replace and check the fuel pump/fuel supply system.
Deposit → Replace.
Damage → Replace.

2. Check:

- Injector resistance
Refer to "CHECKING THE FUEL INJECTORS" on page 8-48.

EAS30769

CHECKING AND CLEANING THE THROTTLE BODIES

TIP

Before checking the throttle bodies, check the following items:

- Valve clearance
- Spark plugs

THROTTLE BODIES

- Air filter element
- Throttle body joints
- Fuel hose
- Exhaust system
- Cylinder head breather hose
- Canister purge hoses

EWA17850

WARNING

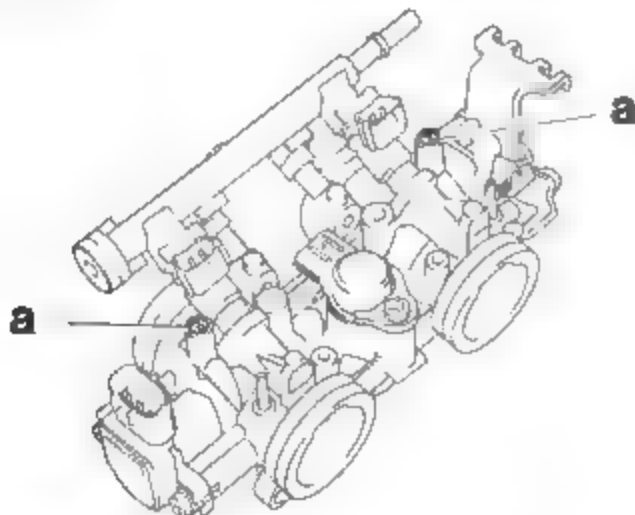
If the throttle bodies are subjected to strong shocks or dropped during checking, replace them.

1. Check:
 - Throttle bodiesCracks/damage → Replace the throttle bodies.
2. Clean:
 - Throttle bodies

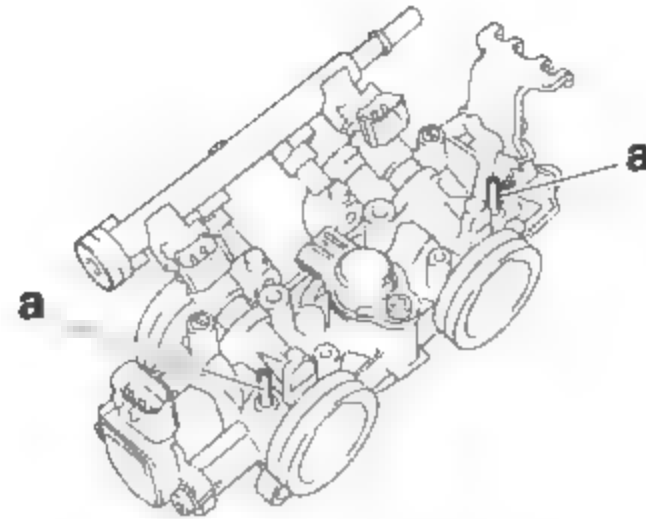
ECA20910

NOTICE

- Observe the following precautions; otherwise, the throttle bodies may not operate properly.
- Do not open the throttle valves quickly.
- Do not subject the throttle bodies to excessive force.
- Wash the throttle bodies in a petroleum-based solvent.
- Do not use any caustic carburetor cleaning solution.
- Do not apply cleaning solvent directly to any plastic parts, sensors, or seals.
- Do not directly push the throttle valves to open them.
- Do not turn the bypass air screws "a"; otherwise, the throttle body synchronization will be affected.



- a. Place the throttle bodies on a flat surface with the air filter case side facing up.
- b. Install the caps (895-14169-00) onto the hose fittings "a".



- c. Push the lever in the direction shown in the illustration to hold the throttle valves in the open position.

EWA16680

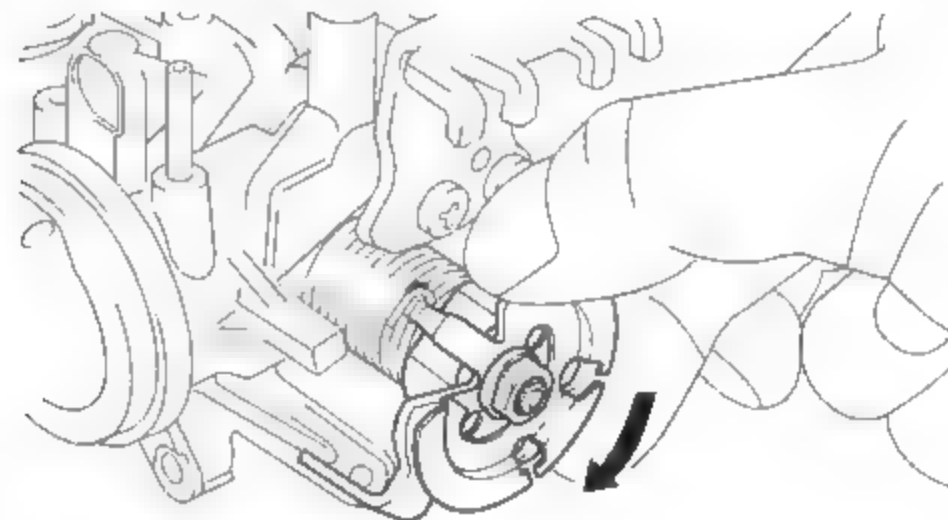
WARNING

When cleaning the throttle bodies, be careful not to injure yourself on the throttle valves or other components of the throttle bodies.

ECA21190

NOTICE

- Do not use tools to open the throttle valves or to keep them in the open position.
- Do not open the throttle valves quickly.



- d. Apply a petroleum-based solvent to the throttle valves and the inside of the throttle bodies to remove any carbon deposits.

TIP

- Do not allow any petroleum-based solvent to enter the opening for the injectors.
- Do not apply any petroleum-based solvent to the portions of the throttle valve shafts between the throttle bodies.

- e. Remove the carbon deposits from the inside of each throttle body in a downward direction, from the air filter case side of the throttle body to the engine side.

ATC

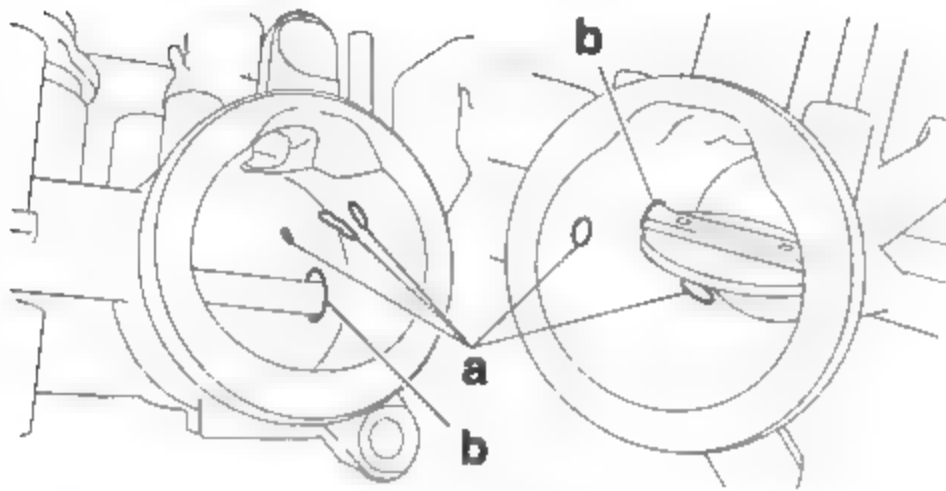
NOTICE

- Do not use a tool, such as a wire brush, to remove the carbon deposits; otherwise, the inside of the throttle bodies may be damaged.

THROTTLE BODIES

- Do not allow carbon deposits or other foreign materials to enter any of the passages in each throttle body or in the space between the throttle valve shaft and the throttle body.

- f. After removing the carbon deposits, clean the inside of the throttle bodies with a petroleum-based solvent, and then dry the throttle bodies using compressed air.
- g. Make sure that there are no carbon deposits or other foreign materials in any of the passages "a" in each throttle body or in the space "b" between the throttle valve shaft and the throttle body.



Cleaning the ISC (idle speed control) valve

1. Remove:
 - ISC (Idle Speed Control) valve plate
 - ISC (Idle Speed Control) valve
 - O-ring
2. Clean:
 - ISC (Idle Speed Control) valve "1"



Recommended cleaning agent:
Yamaha oil & brake cleaner

ECA21230

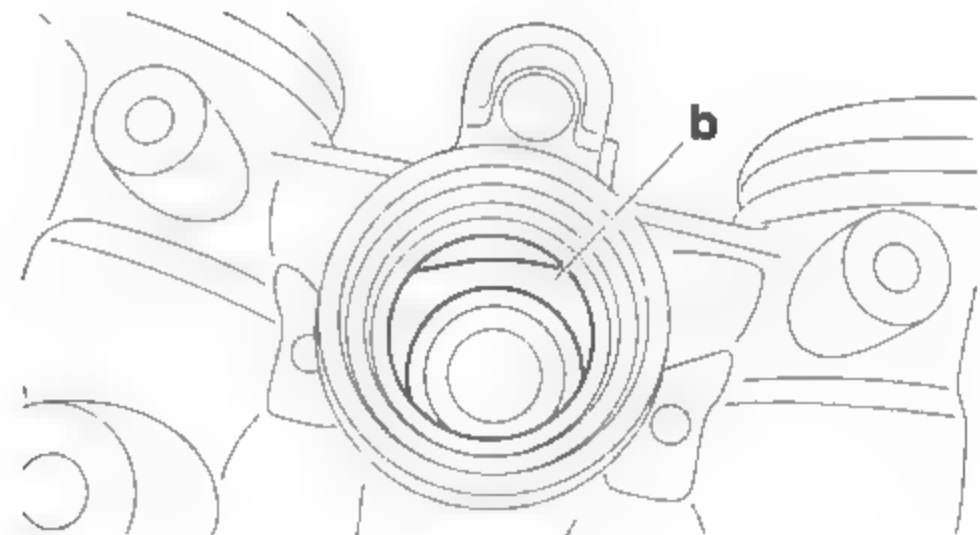
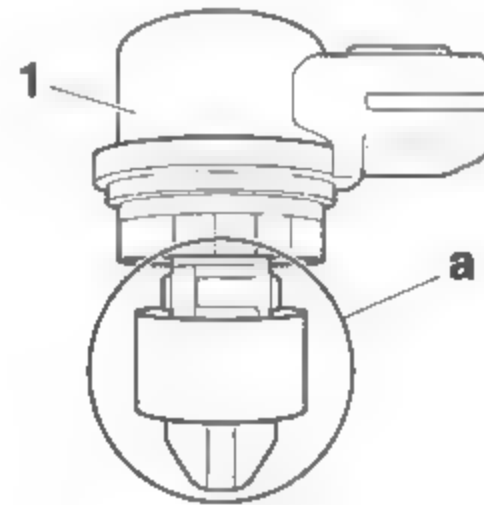
NOTICE

- Be sure to use the recommended cleaning agent.
- Do not spray the cleaning agent directly onto the ISC valve or throttle bodies and do not immerse them in the cleaning agent.
- To prevent scratching the components, do not use a brush, metal file, or other abrasive tool.
- Do not clean with compressed air.
- Do not allow the removed deposits or foreign materials to adhere to the sealing surfaces of the O-ring.

- Do not scratch or deform the ISC valve or air passage; otherwise, poor starting performance, an unstable engine idling speed, or uncontrollable engine speed could result.
- Do not clean any areas other than those indicated in the illustrations. If the cleaning agent attaches to the ISC valve or enters the throttle bodies, thoroughly wipe it off.

TIP

Clean the area "a" of the ISC valve and the ISC valve installation hole "b" in the throttle bodies.



3. Install:

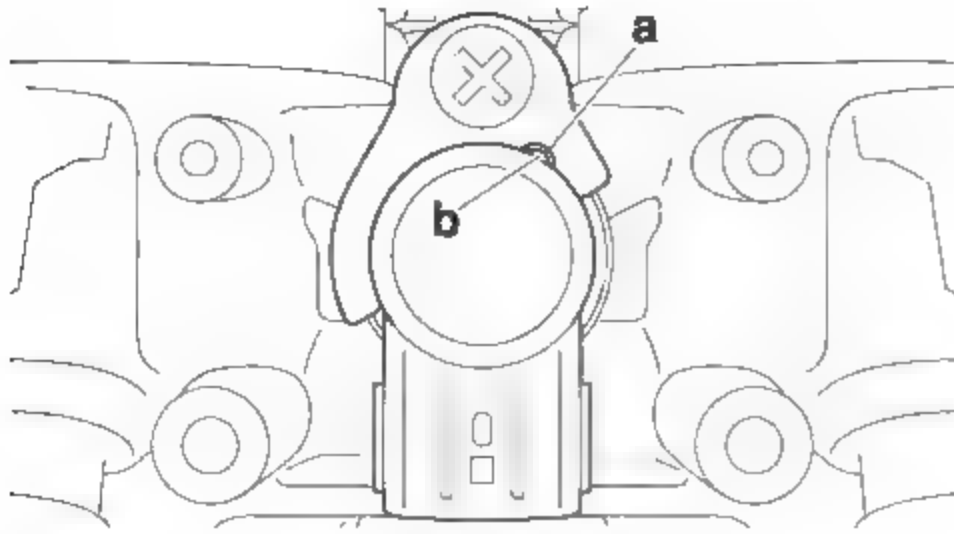
- O-ring **New**
- ISC (Idle Speed Control) valve
- ISC (Idle Speed Control) valve plate



ISC (Idle Speed Control) valve plate screw
5 N·m (0.5 kgf·m, 3.7 lb·ft)

TIP

Align the slot "a" in the ISC valve plate with the projection "b" on the ISC valve.



Resetting the ISC (idle speed control) learning values

1. Install:
 - Throttle bodies
2. Reset:
 - ISC (idle speed control) learning values
Use the diagnostic code number "67".
Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-38.
3. Adjust:
 - Throttle bodies synchronizing
Out of specification → Replace the throttle bodies.
Refer to "SYNCHRONIZING THE THROTTLE BODIES" on page 3-9.

EAS30792

CHECKING THE THROTTLE BODY JOINTS

1. Check:
 - Throttle body joints
Cracks/damage → Replace.

EAS30486

ADJUSTING THE THROTTLE POSITION SENSOR

EWA10000



- Handle the throttle position sensor with special care.
- Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

1. Check:
 - Throttle position sensor
Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-46.
2. Adjust:
 - Throttle position sensor angle
 - a. Temporary tighten the throttle position sensor bolts.
 - b. Check that the throttle valves are fully closed.
 - c. Connect the throttle position sensor to the wire harness.

- d. Disconnect the coupler from the CCU, and then connect the YDT to the coupler.

TIP

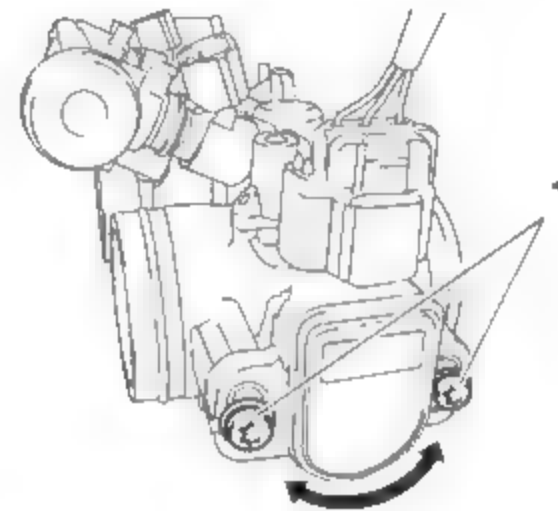
For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.

Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-38.

- e. Diagnostic code number "01" is selected.
- f. Adjust the position of the throttle position sensor angle so that 11-21 can appear in the Yamaha diagnostic tool screen.
- g. After adjusting the throttle position sensor angle, tighten the throttle position sensor bolts "1".



Throttle position sensor screw
3.5 N·m (0.35 kgf·m, 2.6 lb·ft)



ECA20000

INSTALLING THE FUEL INJECTORS

ECA20000

NOTICE

- Always use new O-rings.
- When checking the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rail, or O-rings.
- Be careful not to twist or pinch the O-rings when installing the injectors.
- If an injector is subject to strong shocks or excessive force, replace it.
- If installing the original fuel rail and screws, remove the white paint marks using a cleaning solvent. Otherwise, paint chips on the screw seats could prevent the screws from being tightened to the specified torque.

1. Install new seals onto the end of each injector.
2. Install the fuel injectors to the fuel rail.



Fuel rail bolt
3.5 N·m (0.35 kgf·m, 2.6 lb·ft)

3. Install the fuel injector assemblies to the throttle bodies.
4. Check the injector pressure after the fuel injectors are installed to the throttle bodies. Refer to "CHECKING THE INJECTOR PRESSURE" on page 7-13.

EAS30481

CHECKING THE INJECTOR PRESSURE

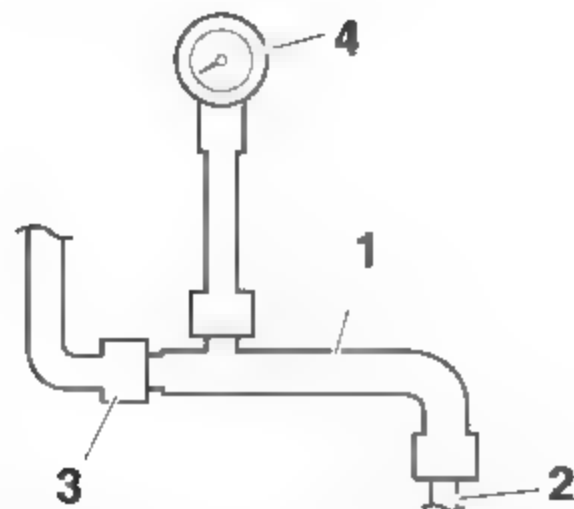
TIP

- After installing the fuel injectors, perform the following steps to check the injector pressure.
- Do not allow any foreign materials to enter the fuel lines.

1. Check:
 - Injector pressure
 - a. Connect the fuel injector pressure adapter "1" to the fuel rail "2", and then connect an air compressor "3" to the adapter.
 - b. Connect the pressure gauge "4" to the fuel injector pressure adapter "1".



Pressure gauge
90890-03153
Pressure gauge
YU-03153
Fuel injector pressure adapter
90890-03210
Fuel injector pressure adapter
YU-03210



G089041

- c. Close the valve on the fuel injector pressure adapter.
- d. Apply air pressure with the air compressor.

- e. Open the valve on the fuel injector pressure adapter until the specified pressure is reached.



Specific air pressure
490 kPa (4.9 kgf/cm², 69.7 psi)

ECA18440

NOTICE

Never exceed the specified air pressure or damage could occur.

- f. Close the valve on the fuel injector pressure adapter.
- g. Check that the specified air pressure is held for about one minute.
Pressure drops → Check the pressure gauge and adapter.
Check the seals and O-rings, and then re-install.
Replace the fuel injectors.

EAS30482

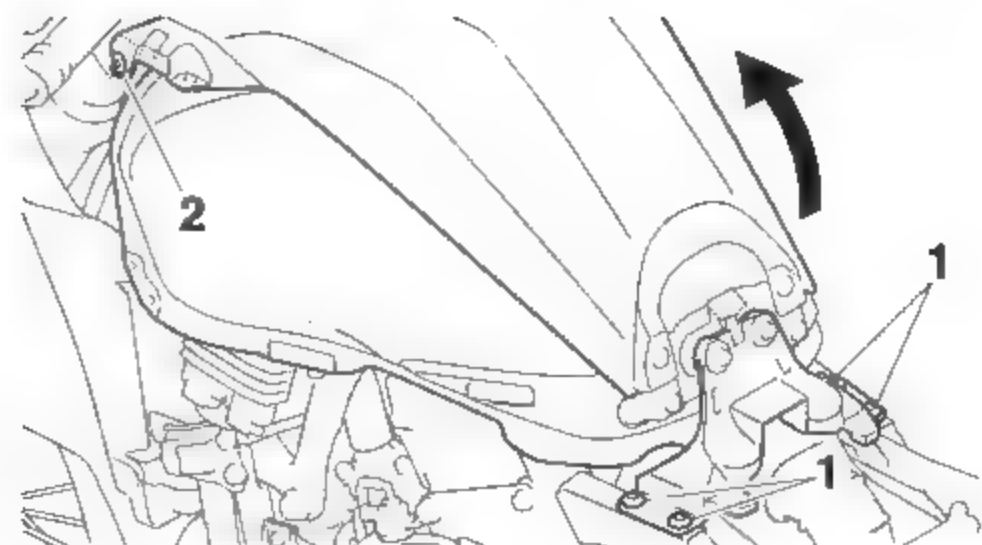
CHECKING THE FUEL PRESSURE

1. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
 - Fuel tank side covers
Refer to "GENERAL CHASSIS (3)" on page 4-5.
2. Check:
 - Fuel pressure
 - a. Remove the rear fuel tank mounting bracket bolts "1" and quick fasteners "2", and then holdup the fuel tank.

ECA23360

NOTICE

When lifting up the fuel tank, be careful not to pull the fuel tank breather/overflow hose.



- b. Disconnect the fuel hose "3" from the fuel tank.

THROTTLE BODIES

EWA18640

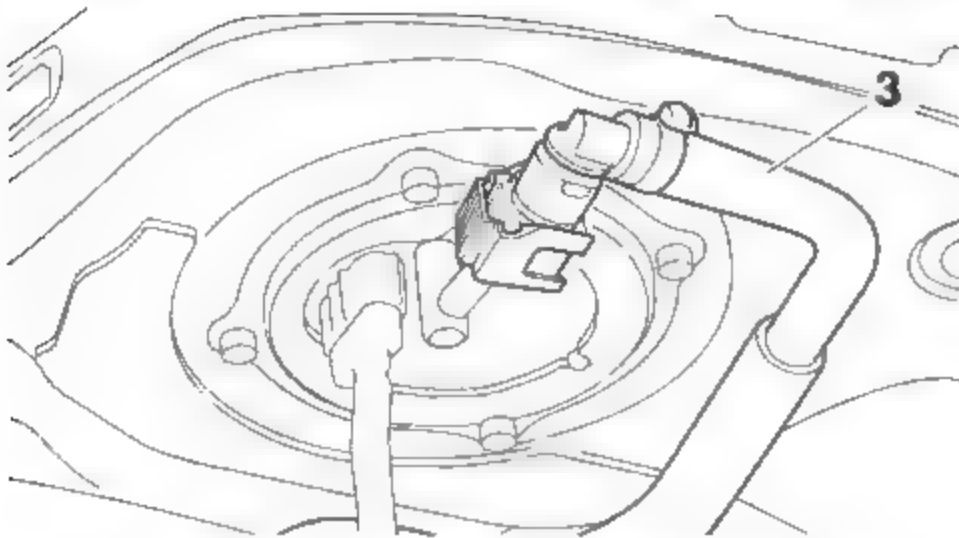
WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

ECA20010

NOTICE

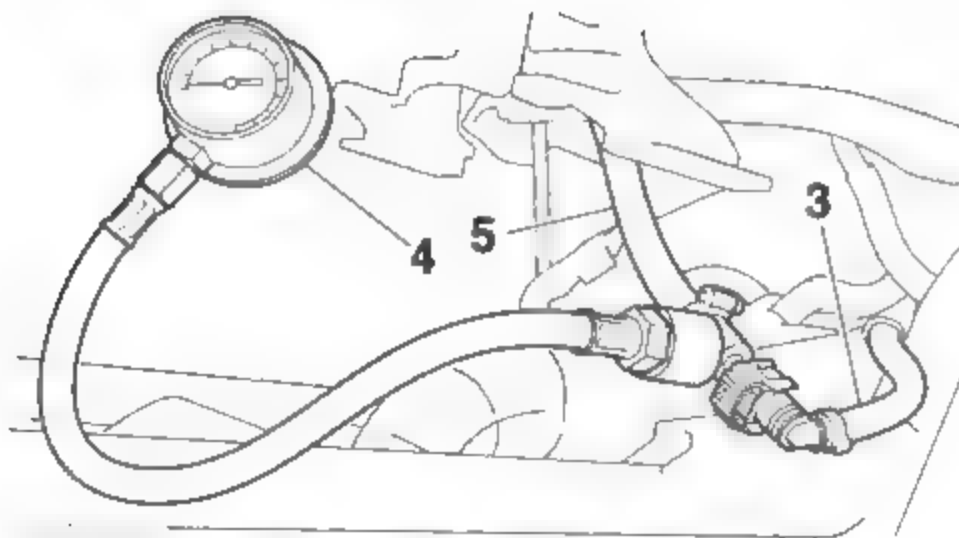
Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.



c. Connect the pressure gauge "4" and adapter "5" to the fuel hose "3".



Pressure gauge
90890-03153
Pressure gauge
YU-03153
Fuel pressure adapter
90890-03176
Fuel pressure adapter
YM-03176



d. Start the engine.
e. Measure the fuel pressure.



Fuel line pressure (at idle)
300–390 kPa (3.0–3.9 kgf/cm²,
43.5–56.6 psi)

Faulty → Replace the fuel pump.

3. Install:
• Fuel tank



Fuel tank mounting bracket bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)

Refer to "FUEL TANK" on page 7-1.

- Fuel tank side covers
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30837

INSTALLING THE THROTTLE BODY JOINTS

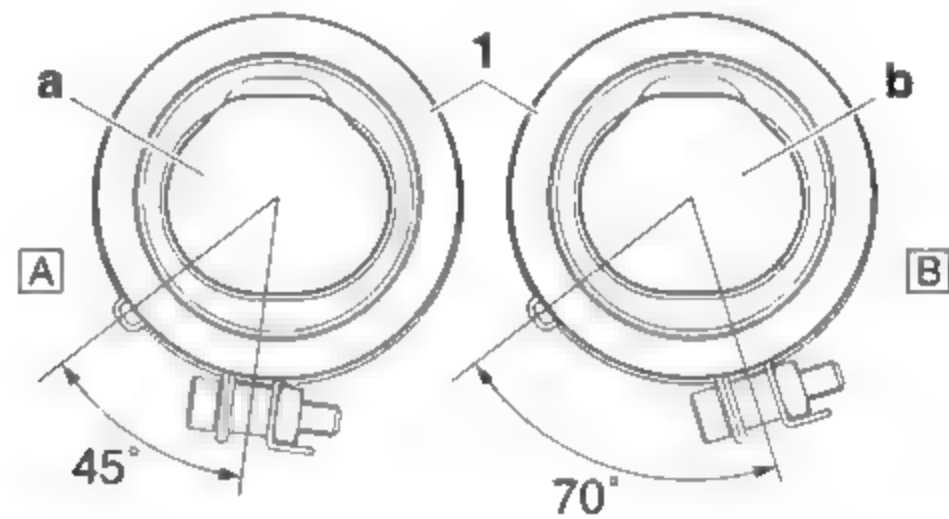
1. Install:
• Throttle body joints "1"



Throttle body joint clamp screw
3.0 N·m (0.30 kgf·m, 2.2 lb·ft)

TIP

Be sure to install the throttle body joints "1" as shown in the illustration.



- a. #1 cylinder
- b. #2 cylinder
- A. Left
- B. Right

EAS33279

INSTALLING THE AIR FILTER CASE JOINTS

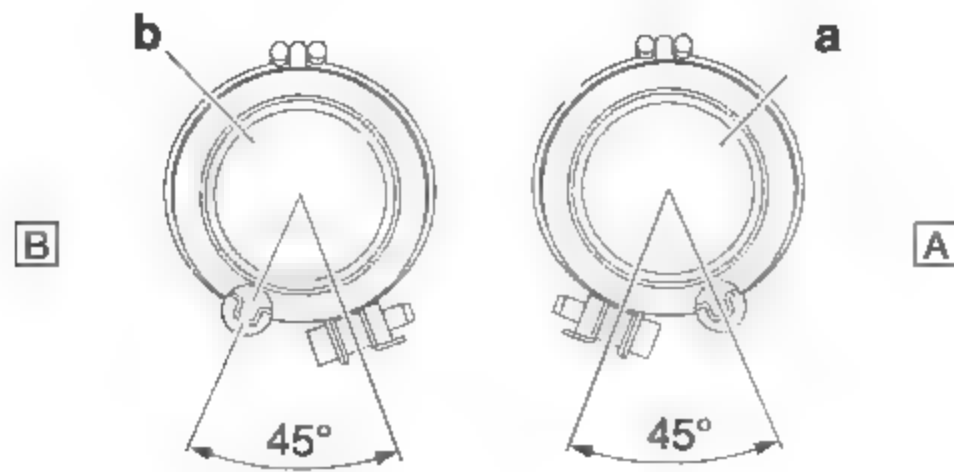
1. Install:
• Air filter case joint clamps "1"



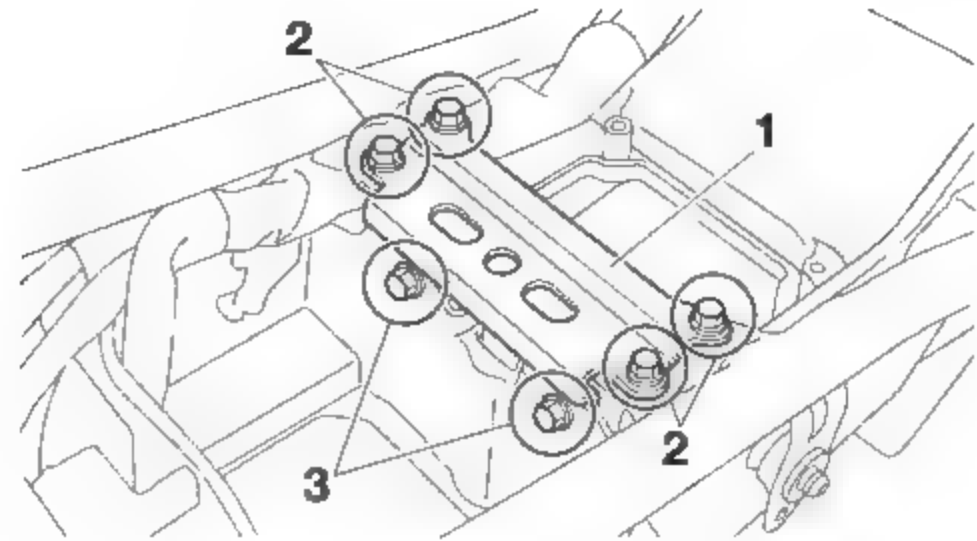
Air filter case joint clamp screw
3.0 N·m (0.30 kgf·m, 2.2 lb·ft)

TIP

- Align the projection on the air filter case joint with the slot in the air filter case joint clamp.
- Face the screw head of the air filter case joint clamp outward.



- a. #1 Cylinder
- b. #2 Cylinder
- A. Left
- B. Right

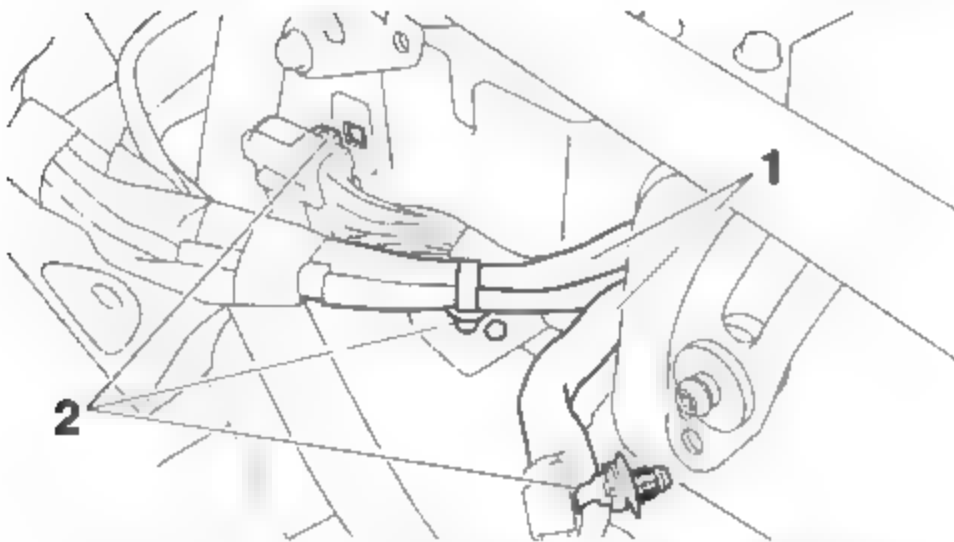


EAS30980

INSTALLING THE THROTTLE BODIES

1. Install:

- Throttle bodies
 - a. Fit the throttle bodies to the throttle body joints.
 - b. Fit the air filter case joints to the throttle bodies.
 - c. Place the wire harness "1" in its original position, and then insert the projections on the holders "2" into the holes in the frame and battery box.



- d. Tighten the air filter case bolts (left/right).



Air filter case bolt (left)
 10 N·m (1.0 kgf·m, 7.4 lb·ft)
Air filter case bolt (right)
 10 N·m (1.0 kgf·m, 7.4 lb·ft)

- e. Install the battery box bracket "1", and then tighten the battery box bracket bolts "2" and battery box bolts "3".



Battery box bracket bolt
 9 N·m (0.9 kgf·m, 6.6 lb·ft)
Battery box bolt
 9 N·m (0.9 kgf·m, 6.6 lb·ft)
 LOCTITE®

ELECTRICAL SYSTEM

IGNITION SYSTEM	8-1
CIRCUIT DIAGRAM	8-1
ENGINE STOPPING DUE TO SIDESTAND OPERATION	8-3
TROUBLESHOOTING	8-4
ELECTRIC STARTING SYSTEM	8-7
CIRCUIT DIAGRAM	8-7
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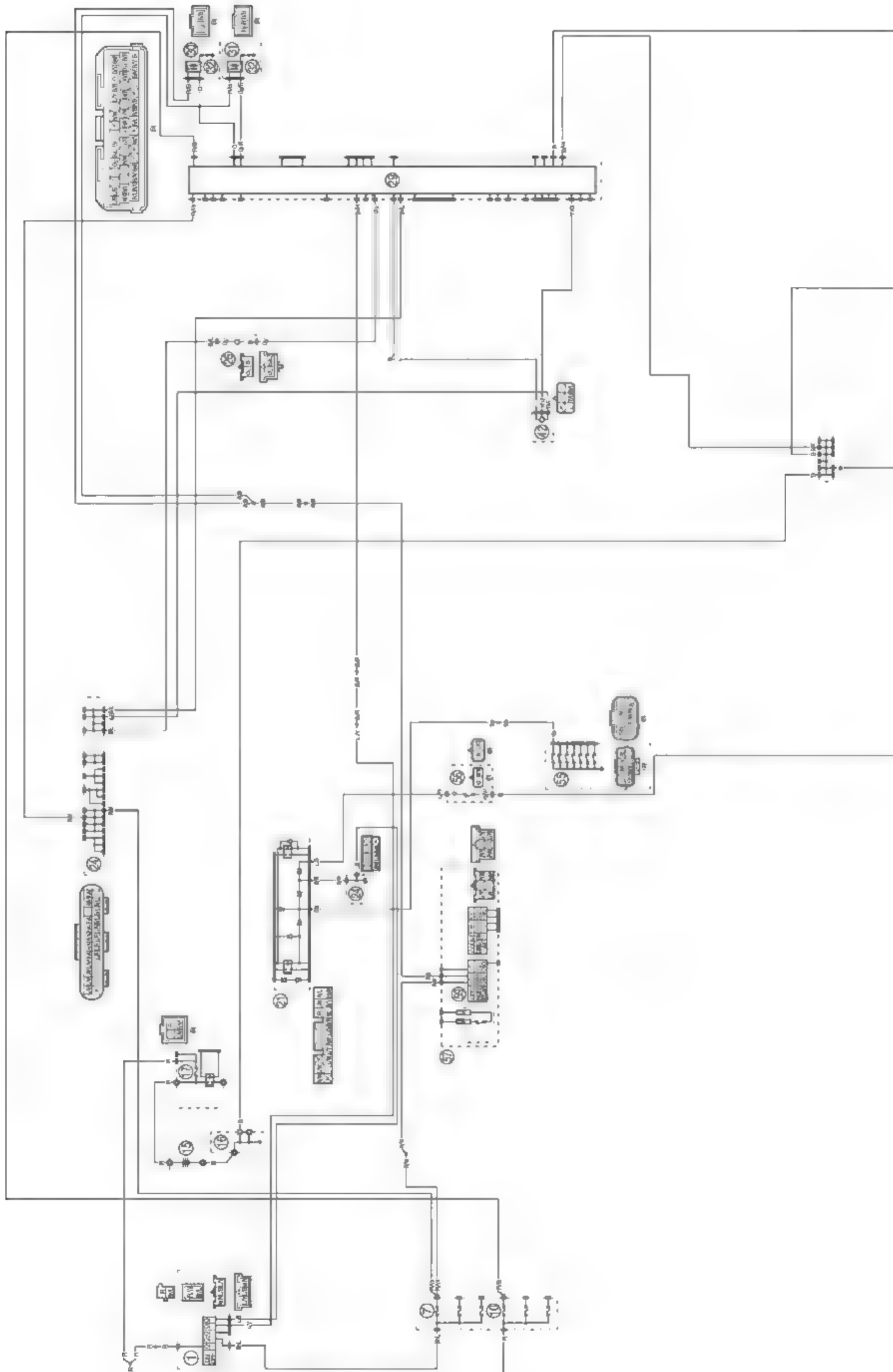
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EAS20072

IGNITION SYSTEM

EAS30490

CIRCUIT DIAGRAM



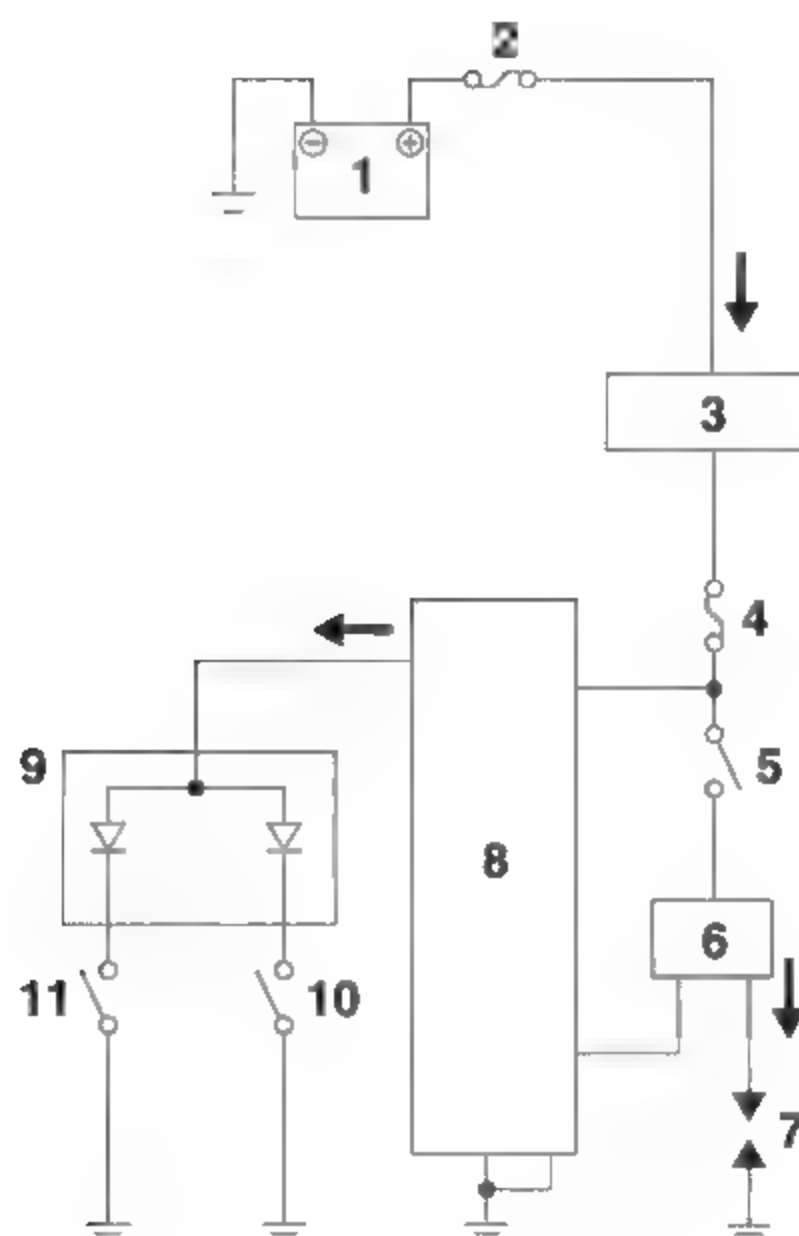
- 1. Main switch
- 7. Ignition fuse
- 10. Fuel injection system fuse
- 15. Battery
- 16. Engine ground
- 17. Main fuse
- 21. Relay unit (diode)
- 24. Joint coupler
- 26. Crankshaft position sensor
- 29. ECU (Engine Control Unit)
- 30. Ignition coil #1
- 31. Ignition coil #2
- 32. Spark plug
- 42. Lean angle sensor
- 55. Gear position switch
- 56. Sidestand switch
- 57. Handlebar switch (right)
- 59. Stop/run/start switch

EAS30491

ENGINE STOPPING DUE TO SIDE STAND OPERATION

When the engine is running and the transmission is in gear, the engine will stop if the sidestand is moved down. This is because the electric current from the ECU does not flow to the ignition coils or fuel injectors when the gear position switch (neutral circuit) or sidestand switch is open. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral circuit of the gear position switch is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral circuit of the gear position switch is closed) and the sidestand is down (the sidestand switch circuit is open).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Engine stop switch
6. Ignition coil
7. Spark plug
8. ECU (Engine Control Unit)
9. Relay unit (diode)
10. Sidestand switch
11. Gear position switch

EAS30492

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Fuel tank side covers
4. Drive sprocket cover
5. Fuel tank

1. Check the fuses. (Ignition, fuel injection system, and main) Refer to "CHECKING THE FUSES" on page 8-38.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-5.	NG →	Re-gap or replace the spark plug(s).
OK ↓		
4. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 8-42.	OK →	Ignition system is OK.
NG ↓		
5. Check the ignition coils. Refer to "CHECKING THE IGNITION COILS" on page 8-41.	NG →	Replace the ignition coil(s).
OK ↓		
6. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-42.	NG →	Replace the crankshaft position sensor.
OK ↓		
7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	Replace the main switch.
OK ↓		

IGNITION SYSTEM

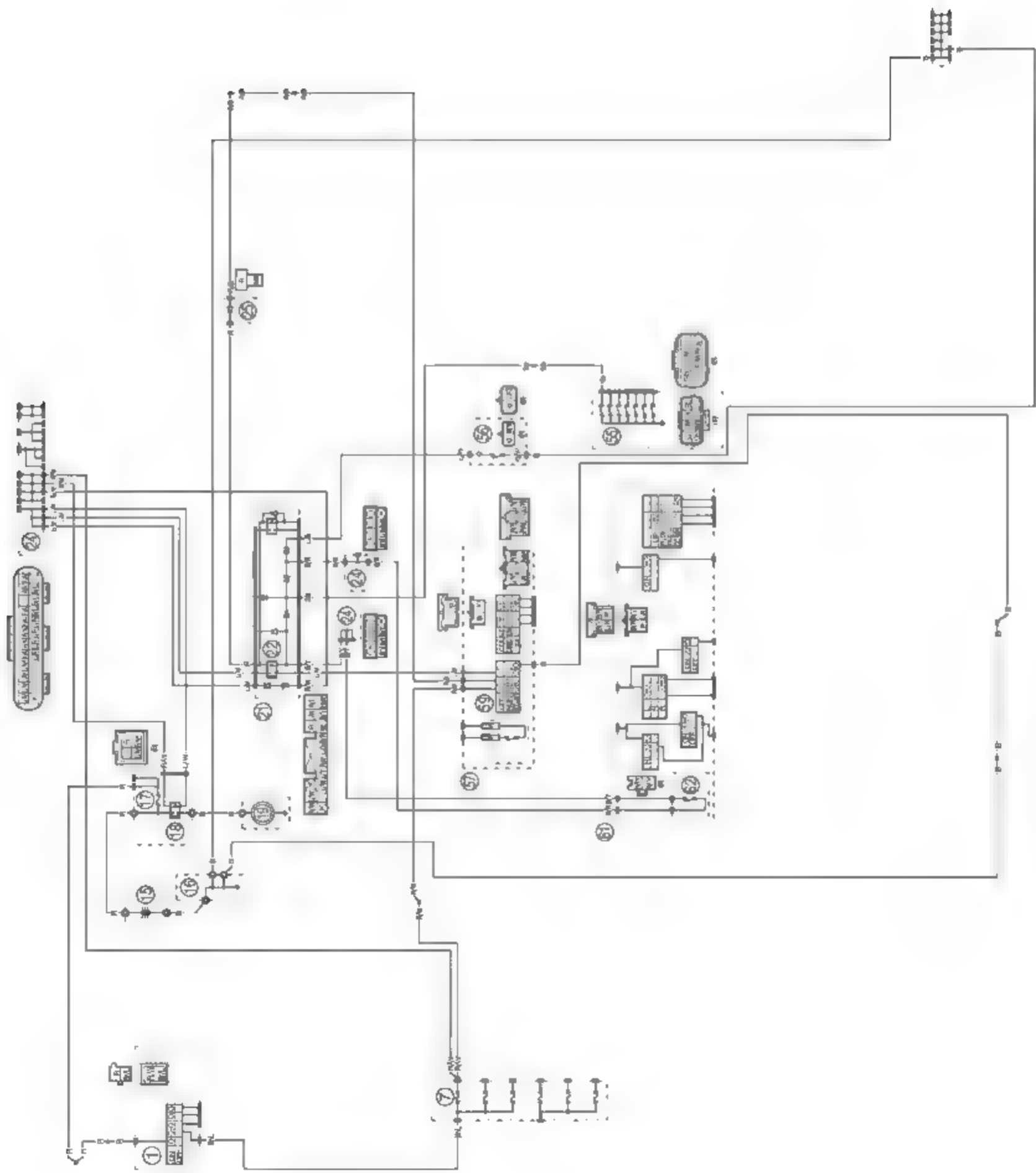
<p>8. Check the stop/run/start switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p>	NG →	<ul style="list-style-type: none"> • The stop/run/start switch is faulty. • Replace the right handlebar switch.
OK ↓		
<p>9. Check the gear position switch. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-47.</p>	NG →	<p>Replace the gear position switch.</p>
OK ↓		
<p>10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p>	NG →	<p>Replace the sidestand switch.</p>
OK ↓		
<p>11. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-40.</p>	NG →	<p>Replace the relay unit.</p>
OK ↓		
<p>12. Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-43.</p>	NG →	<p>Replace the lean angle sensor.</p>
OK ↓		
<p>13. Check the entire ignition system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-1.</p>	NG →	<p>Properly connect or replace the wiring harness.</p>
OK ↓		
<p>Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.</p>		

EAS20073

ELECTRIC STARTING SYSTEM

EAS30493

CIRCUIT DIAGRAM



ELECTRIC STARTING SYSTEM

- 1. Main switch
- 7. Ignition fuse
- 15. Battery
- 16. Engine ground
- 17. Main fuse
- 18. Starter relay
- 19. Starter motor
- 21. Relay unit (diode)
- 22. Starting circuit cut-off relay
- 24. Joint coupler
- 25. Diode
- 55. Gear position switch
- 56. Sidestand switch
- 57. Handlebar switch (right)
- 59. Stop/run/start switch
- 61. Handlebar switch (left)
- 62. Clutch switch

ELECTRIC STARTING SYSTEM

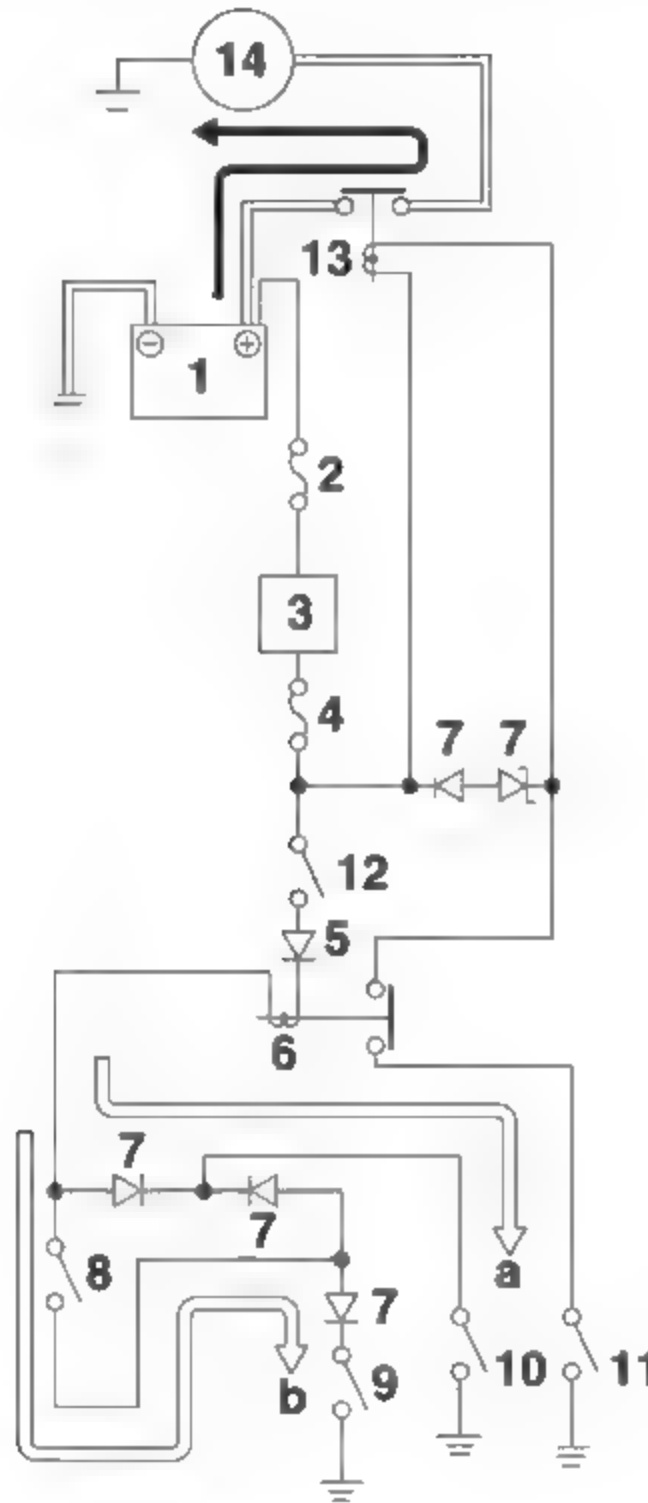
EAS30494

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is turned to "ON", and the start switch is pushed, the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral circuit of the gear position switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met, the starting circuit cut-off relay is closed and the engine can be started by pressing the start switch.



a. WHEN THE TRANSMISSION IS IN NEUTRAL

b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR

1. Battery

2. Main fuse

3. Main switch

4. Ignition fuse

5. Diode

6. Starting circuit cut-off relay

7. Relay unit (diode)

8. Clutch switch

9. Sidestand switch

10. Gear position switch

11. Start switch

12. Stop/run/start switch

13. Starter relay

14. Starter motor

EAS30495

TROUBLESHOOTING

The starter motor fails to turn.

TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Drive chain cover

1. Check the fuses. (Ignition and main) Refer to "CHECKING THE FUSES" on page 8-38.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the starter motor operation. Refer to "CHECKING THE STARTER MOTOR OPERATION" on page 8-43.	OK →	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.
NG ↓		
4. Check the starter motor. Refer to "CHECKING THE STARTER MOTOR" on page 5-50.	NG →	Repair or replace the starter motor.
OK ↓		
5. Check the relay unit (starting circuit cut-off relay). Refer to "CHECKING THE RELAYS" on page 8-39.	NG →	Replace the relay unit.
OK ↓		
6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-40.	NG →	Replace the relay unit.
OK ↓		
7. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 8-39.	NG →	Replace the starter relay.
OK ↓		
8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	Replace the main switch.
OK ↓		

ELECTRIC STARTING SYSTEM

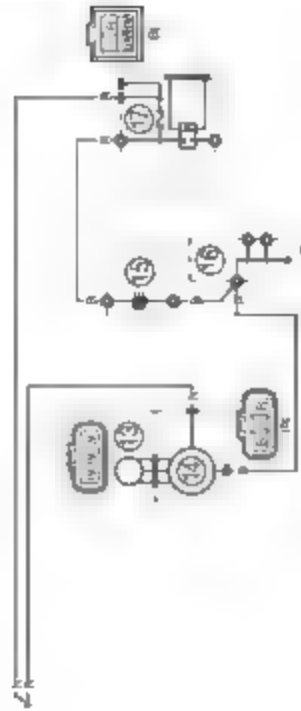
9. Check the gear position switch. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-47.	NG →	Replace the gear position switch.
OK ↓		
10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	Replace the sidestand switch.
OK ↓		
11. Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	Replace the clutch switch.
OK ↓		
12. Check the stop/run/start switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	<ul style="list-style-type: none">• The stop/run/start switch is faulty.• Replace the right handlebar switch.
OK ↓		
13. Check the diode. Refer to "CHECKING THE DIODE" on page 8-40.	NG →	Replace the diode.
OK ↓		
14. Check the entire starting system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-7.	NG →	Properly connect or replace the wiring harness.
OK ↓		
The starting system circuit is OK.		

EAS20074

CHARGING SYSTEM

EAS50496

CIRCUIT DIAGRAM



- 13.Stator coil
- 14.Rectifier/regulator
- 15.Battery
- 16.Engine ground
- 17.Main fuse

EAS30497

TROUBLESHOOTING

The battery is not being charged.

TIP

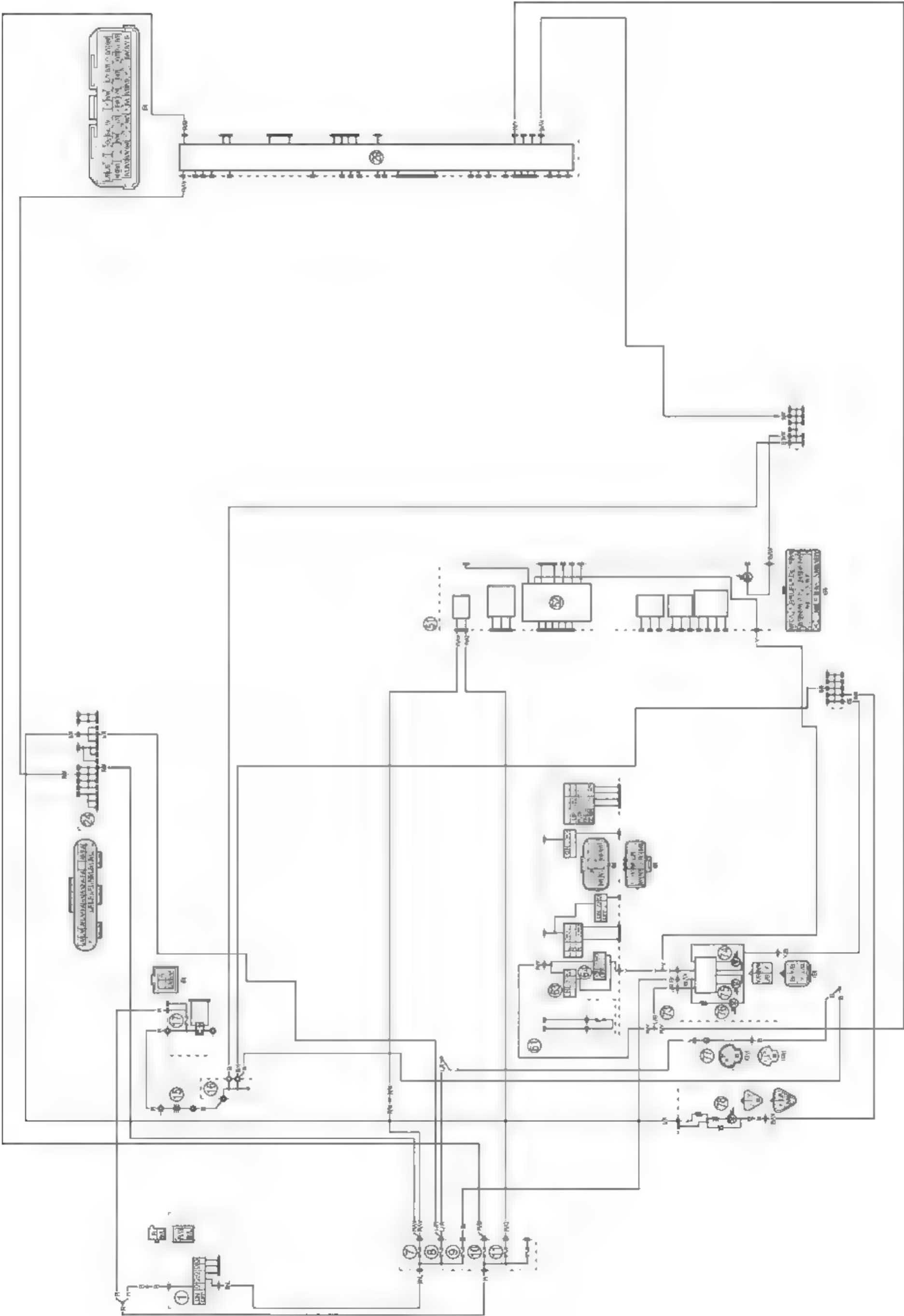
- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Air scoop (left)

1. Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 8-38.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-43.	NG →	Replace the stator coil assembly.
OK ↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 8-44.	NG →	Replace the rectifier/regulator.
OK ↓		
5. Check the entire charging system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-12.	NG →	Properly connect or replace the wiring harness.
OK ↓		
The charging system circuit is OK.		

EAS20075
LIGHTING SYSTEM

EAS30498
CIRCUIT DIAGRAM



- 1. Main switch
- 7. Ignition fuse
- 8. Signaling system fuse
- 9. Headlight fuse
- 10. Fuel injection system fuse
- 11. Backup fuse
- 15. Battery
- 16. Engine ground
- 17. Main fuse
- 24. Joint coupler
- 29. ECU (Engine Control Unit)
- 51. Meter assembly
- 52. Multi-function meter
- 61. Handlebar switch (left)
- 63. Dimmer switch
- 64. Pass switch
- 73. Headlight assembly
- 74. Headlight (high beam)
- 75. Headlight (low beam)
- 76. Auxiliary light
- 77. License plate light
- 78. Tail/brake light

EAS30499

TROUBLESHOOTING

Any of the following fail to light: headlight (high beam), headlight (low beam), auxiliary light, license plate light, taillight, meter light or high beam indicator light.

TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover

1. Check the license light bulb and license light bulb socket condition. Refer to "CHECKING THE BULBS AND BULB SOCKETS" in "BASIC INFORMATION" (separate volume).	NG →	Replace the bulb and bulb socket.
OK ↓		
2. Check the fuses. (Ignition, signaling system, fuel injection system, headlight, backup and main) Refer to "CHECKING THE FUSES" on page 8-38.	NG →	Replace the fuse(s).
OK ↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	Replace the main switch.
OK ↓		
5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	<ul style="list-style-type: none"> • The dimmer switch is faulty. • Replace the left handlebar switch.
OK ↓		
6. Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	<ul style="list-style-type: none"> • The pass switch is faulty. • Replace the left handlebar switch.
OK ↓		

7. Check the entire lighting system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-15.

OK ↓

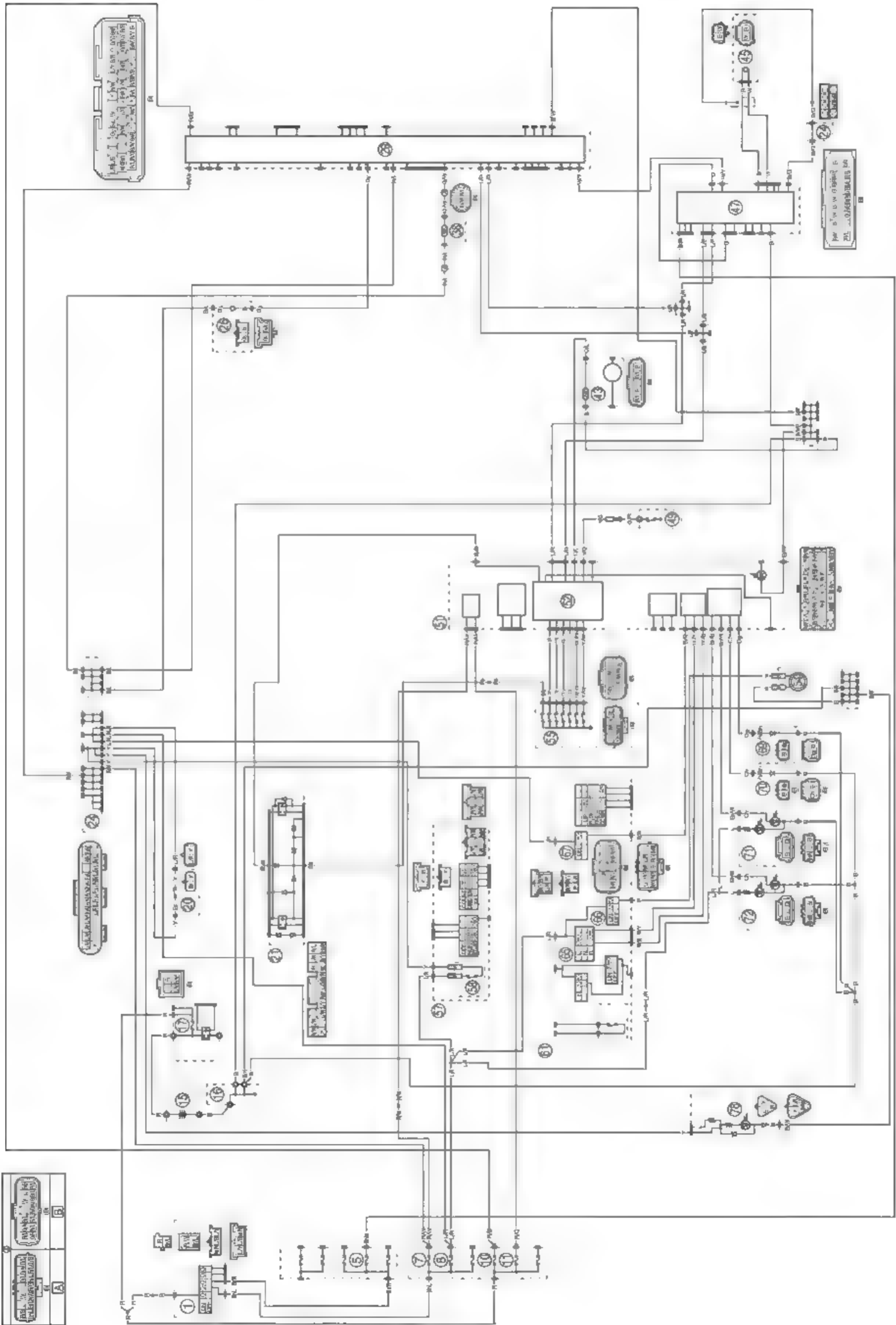
Replace the ECU, meter assembly, headlight assembly or tail/brake light.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

NG →

Properly connect or replace the wiring harness.

EAS20076
SIGNALING SYSTEM

EAS30500
CIRCUIT DIAGRAM



- 1. Main switch
- 5. ABS control unit fuse
- 7. Ignition fuse
- 8. Signaling system fuse
- 10. Fuel injection system fuse
- 11. Backup fuse
- 15. Battery
- 16. Engine ground
- 17. Main fuse
- 20. Rear brake light switch
- 21. Relay unit (diode)
- 24. Joint coupler
- 26. Crankshaft position sensor
- 29. ECU (Engine Control Unit)
- 38. Coolant temperature sensor
- 43. Fuel sender
- 45. Front wheel sensor
- 47. ABS ECU
- 49. Oil pressure switch
- 51. Meter assembly
- 52. Multi-function meter
- 54. Horn
- 55. Gear position switch
- 57. Handlebar switch (right)
- 58. Front brake light switch
- 61. Handlebar switch (left)
- 65. Turn signal switch
- 66. Horn switch
- 67. Hazard switch
- 69. Rear turn signal light (right)
- 70. Rear turn signal light (left)
- 71. Front turn signal/position light (right)
- 72. Front turn signal/position light (left)
- 78. Tail/brake light
- A. Wire harness
- B. Sub-wire harness

EAS30501

TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or indicator light.
- The horn fails to sound.
- The fuel meter fails to operate.
- The speedometer fails to operate.
- The tachometer fails to operate.

TIP

- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Drive sprocket cover
4. Fuel tank

1. Check the fuses. (ABS control unit, ignition, signaling system, fuel injection system, backup and main) Refer to "CHECKING THE FUSES" on page 8-38.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	Replace the main switch.
OK ↓		
4. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-19.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Check the condition of each of the signaling system circuits. Refer to "Checking the signaling system".		

Checking the signaling system

The horn fails to sound.

1. Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	<ul style="list-style-type: none"> • The horn switch is faulty. • Replace the left handlebar switch.
OK ↓		

SIGNALING SYSTEM

2. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-19.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Replace the horn.		
The brake light fails to come on.		
1. Check the front brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	Replace the front brake light switch.
OK ↓		
2. Check the rear brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	Replace the rear brake light switch.
OK ↓		
3. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-19.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Replace the tail/brake light.		
The turn signal light, turn signal indicator light or both fail to blink.		
1. Check the turn signal switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	<ul style="list-style-type: none">• The turn signal switch is faulty.• Replace the left handlebar switch.
OK ↓		
2. Check the hazard switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	<ul style="list-style-type: none">• The hazard switch is faulty.• Replace the left handlebar switch.
OK ↓		
3. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-19.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Replace the turn signal light or meter assembly.		

SIGNALING SYSTEM

The neutral indicator light fails to come on.

1. Check the gear position switch.
Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-47.

NG →

Replace the gear position switch.

OK ↓

2. Check the relay unit (diode).
Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-40.

NG →

Replace the relay unit.

OK ↓

3. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the meter assembly.

The oil pressure warning light fails to come on when the main switch is set to "ON".

1. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

2. Disconnect the oil pressure switch lead from the oil pressure switch, and then check whether the oil pressure warning light comes on when the lead is connected to the engine ground.

NG →

Replace the meter assembly.

OK ↓

Replace the oil pressure switch.

The oil pressure warning light remains on after the engine is started.

1. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

2. Measure the engine oil pressure.
Refer to "MEASURING THE ENGINE OIL PRESSURE" on page 3-26.

NG →

Check the engine oil leakage, oil viscosity, oil seal, oil filter, or oil pump.

OK ↓

Replace the oil pressure switch.

SIGNALING SYSTEM

The fuel meter fails to operate.

1. Check the fuel sender.
Refer to "CHECKING THE FUEL SENDER" on page 8-44.

NG →

Replace the fuel pump assembly.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the meter assembly.

The coolant temperature warning light fails to come on.

1. Check the coolant temperature sensor.
Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-45.

NG →

Replace the coolant temperature sensor.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the ECU or meter assembly.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

The speedometer fails to operate.

1. Check the front wheel sensor.
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

NG →

Replace the front wheel sensor.

OK ↓

2. Check the entire front wheel sensor wiring.
See TIP.

NG →

Properly connect or replace the wiring harness.

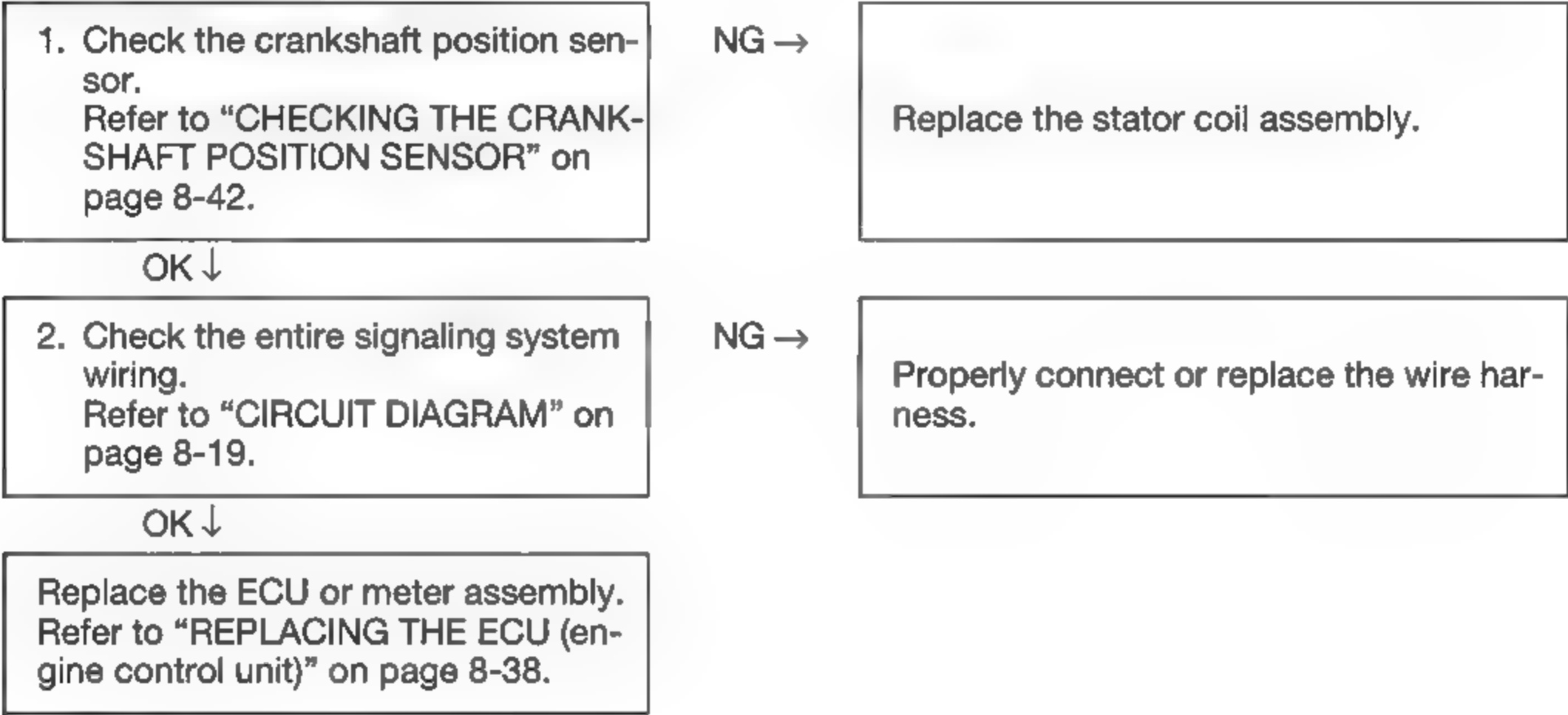
OK ↓

Replace the ECU, ABS ECU, or meter assembly. Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

TIP

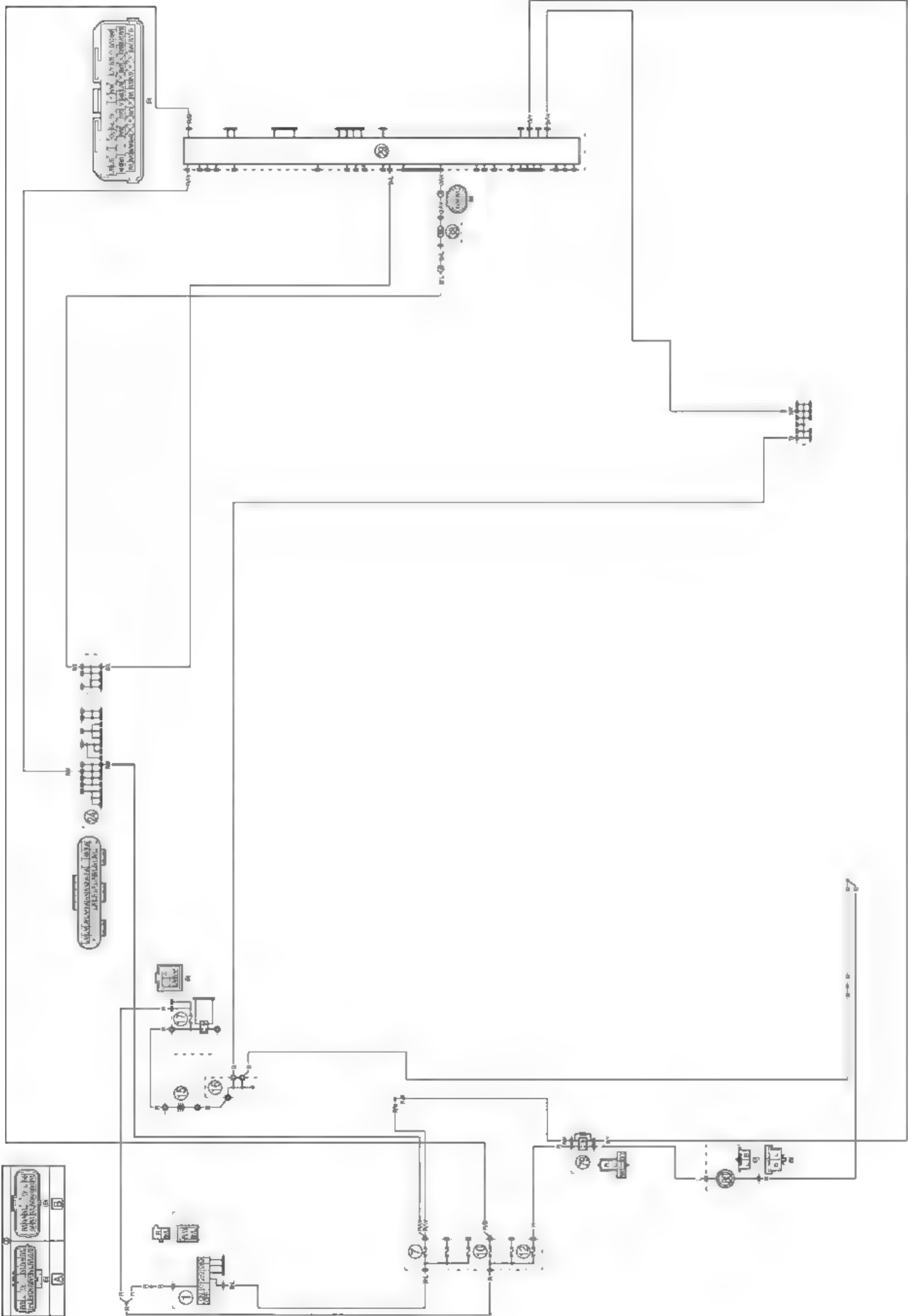
- Replace the wire harness if there is an open or short circuit.
- Between front wheel sensor coupler and ABS ECU coupler.
(white–white)
(black–black)
 - Between ABS ECU coupler and meter assembly coupler.
(blue/black–blue/black)
(blue/red–blue/red)

The tachometer fails to operate.



EAS20077
COOLING SYSTEM

EAS80502
CIRCUIT DIAGRAM



- 1. Main switch
- 7. Ignition fuse
- 10. Fuel injection system fuse
- 12. Radiator fan motor fuse
- 15. Battery
- 16. Engine ground
- 17. Main fuse
- 24. Joint coupler
- 29. ECU (Engine Control Unit)
- 38. Coolant temperature sensor
- 79. Radiator fan motor relay
- 80. Radiator fan motor
- A. Wire harness
- B. Sub-wire harness

TROUBLESHOOTING

The radiator fan motor fails to turn.

TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Fuel tank

<p>1. Check the fuses. (Ignition, fuel injection system, radiator fan motor, and main) Refer to "CHECKING THE FUSES" on page 8-38.</p>	NG →	Replace the fuse(s).
OK ↓		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.</p>	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
<p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p>	NG →	Replace the main switch.
OK ↓		
<p>4. Check the radiator fan motor. Refer to "CHECKING THE RADIATOR FAN MOTOR" on page 8-45.</p>	NG →	Replace the radiator fan motor.
OK ↓		
<p>5. Check the radiator fan motor relay. Refer to "CHECKING THE RELAYS" on page 8-39.</p>	NG →	Replace the radiator fan motor relay.
OK ↓		
<p>6. Check the coolant temperature sensor. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-45.</p>	NG →	Replace the coolant temperature sensor.
OK ↓		

7. Check the entire cooling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-27.

OK ↓

Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

NG →

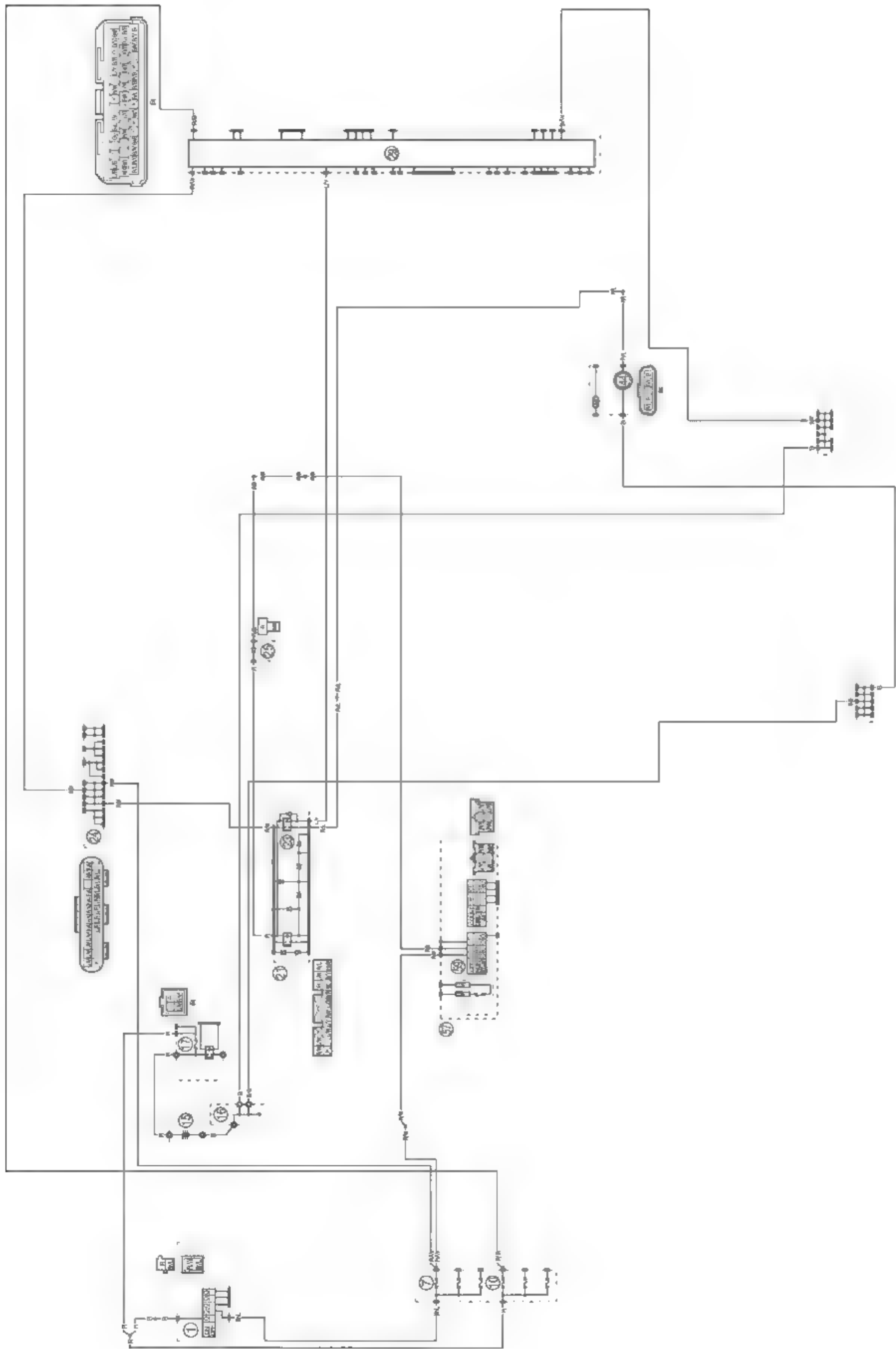
Properly connect or replace the wiring harness.

EAS20081

FUEL PUMP SYSTEM

EAS50519

CIRCUIT DIAGRAM



- 1. Main switch
- 7. Ignition fuse
- 10. Fuel injection system fuse
- 15. Battery
- 16. Engine ground
- 17. Main fuse
- 21. Relay unit (diode)
- 23. Fuel pump relay
- 24. Joint coupler
- 25. Diode
- 29. ECU (Engine Control Unit)
- 44. Fuel pump
- 57. Handlebar switch (right)
- 59. Stop/run/start switch

EAS30514

TROUBLESHOOTING

If the fuel pump fails to operate.

TIP

- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Fuel tank

1. Check the fuses. (Ignition, fuel injection system and main) Refer to "CHECKING THE FUSES" on page 8-38.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	Replace the main switch.
OK ↓		
4. Check the stop/run/start switch. Refer to "CHECKING THE SWITCHES" on page 8-37.	NG →	<ul style="list-style-type: none"> • The stop/run/start switch is faulty. • Replace the right handlebar switch.
OK ↓		
5. Check the diode. Refer to "CHECKING THE DIODE" on page 8-40.	NG →	Replace the diode.
OK ↓		
6. Check the relay unit (fuel pump relay). Refer to "CHECKING THE RELAYS" on page 8-39.	NG →	Replace the relay unit.
OK ↓		
7. Check the fuel pump. Refer to "CHECKING THE FUEL PUMP BODY" on page 7-3.	NG →	Replace the fuel pump assembly.
OK ↓		

FUEL PUMP SYSTEM

8. Check the entire fuel pump system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-31.

OK ↓

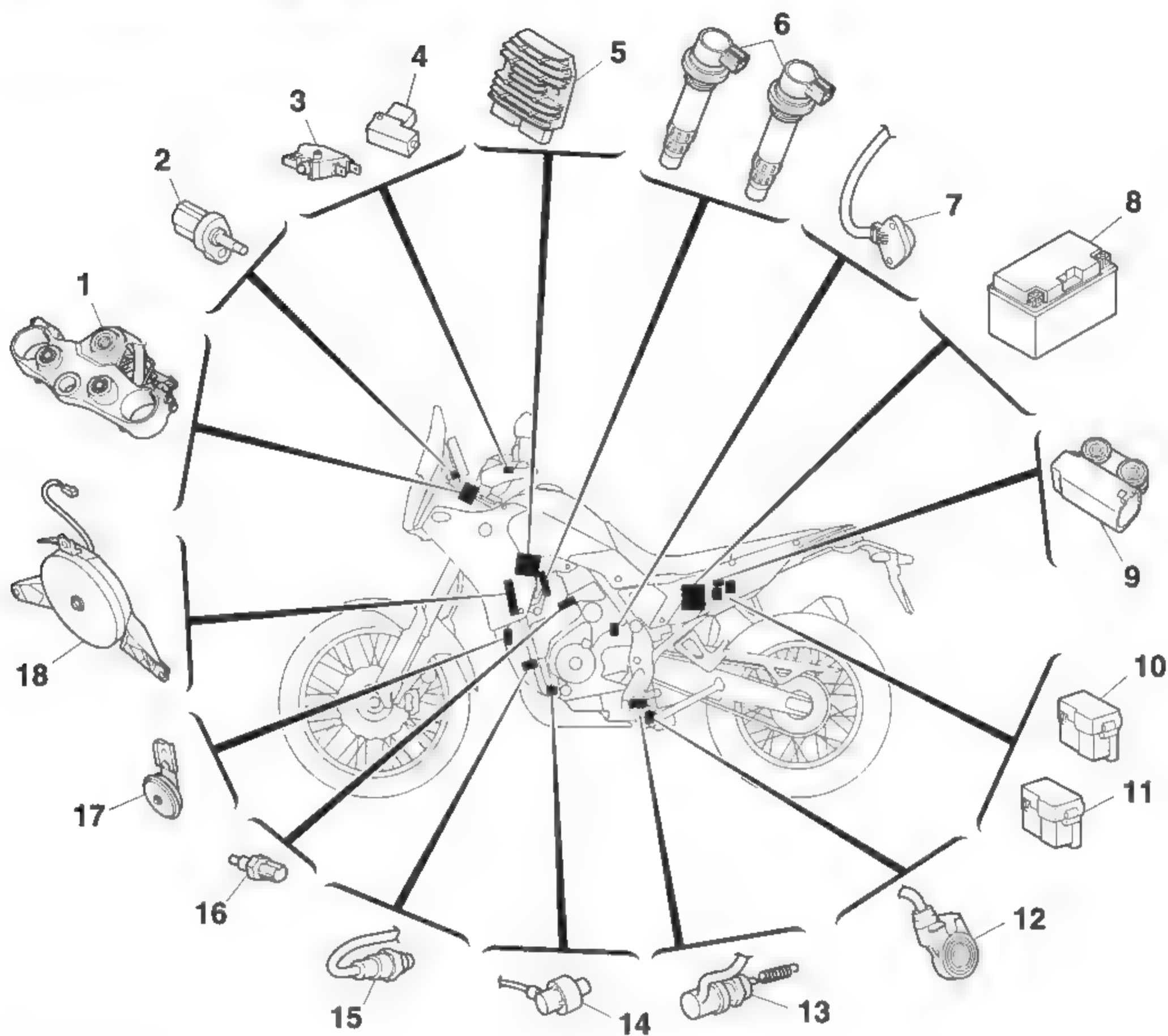
Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

NG →

Properly connect or replace the wiring harness.

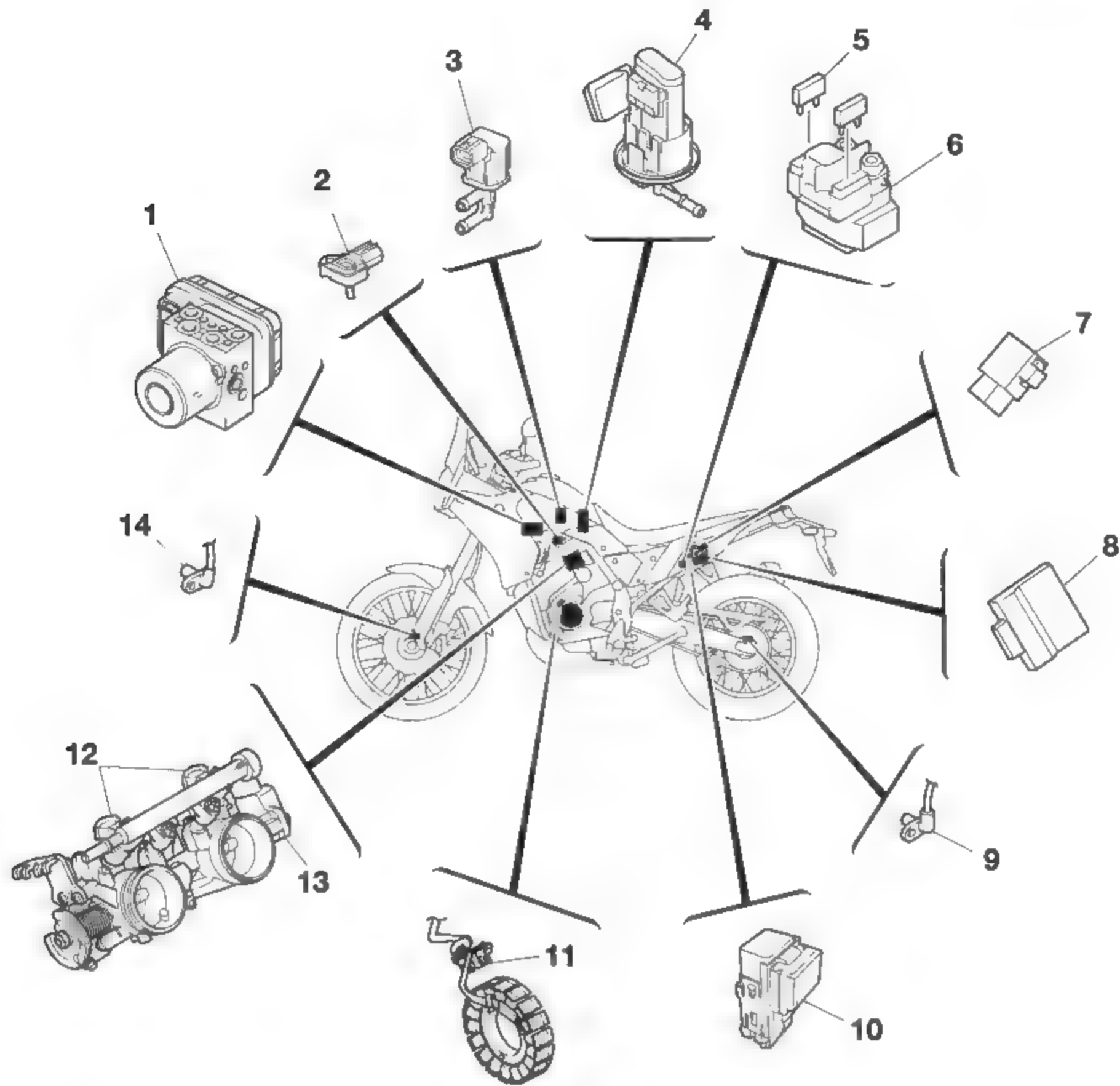
EAS20089

ELECTRICAL COMPONENTS



1. Main switch
2. Intake air temperature sensor
3. Front brake light switch
4. Clutch switch
5. Rectifier/regulator
6. Ignition coil
7. Gear position switch
8. Battery
9. Lean angle sensor
10. Fuse box 1
11. Fuse box 2
12. Sidestand switch
13. Rear brake light switch
14. Oil pressure switch
15. O₂ sensor
16. Coolant temperature sensor
17. Horn
18. Radiator fan motor

ELECTRICAL COMPONENTS

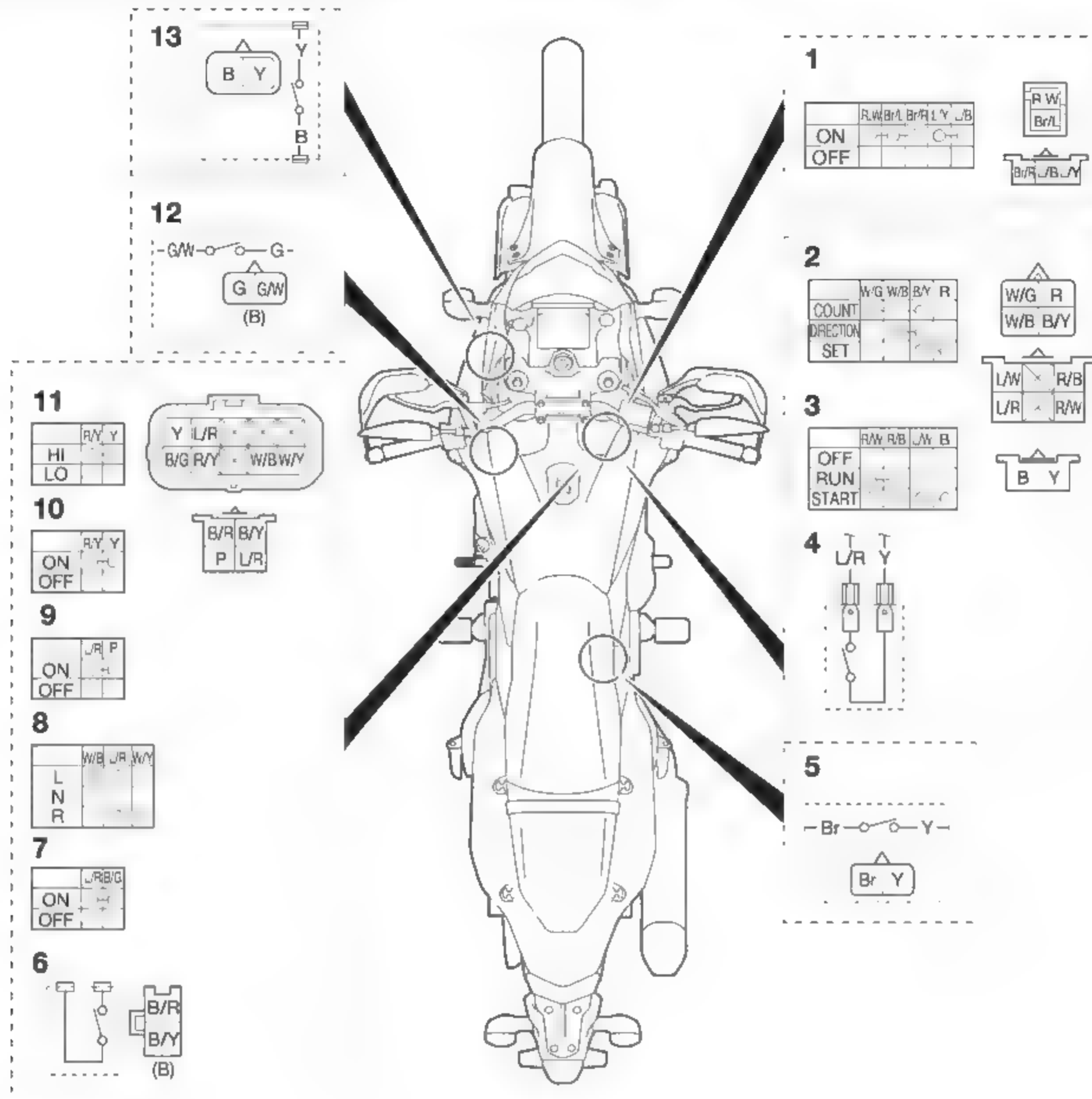


1. Hydraulic unit assembly
2. Intake air pressure sensor
3. Purge cut valve solenoid
4. Fuel pump
5. Main fuse
6. Starter relay
7. Relay unit (diode)
8. ECU (Engine Control Unit)
9. Rear wheel sensor
10. Radiator fan motor relay
11. Crankshaft position sensor
12. Fuel injector
13. Throttle position sensor
14. Front wheel sensor

EAS30549

CHECKING THE SWITCHES

Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.



1. Main switch
2. Wheel switch
3. Stop/run/start switch
4. Front brake light switch
5. Rear brake light switch
6. Clutch switch
7. Hazard switch
8. Turn signal switch
9. Horn switch
10. Pass switch
11. Dimmer switch
12. Sidestand switch
13. "ABS ON" button

EAS30551


CHECKING THE FUSES

The following procedure applies to all of the fuses.

ECA13680

NOTICE

To avoid a short circuit, always set the main switch to "OFF" when checking or replacing a fuse.

1. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
 2. Check:
 - Fuse
 - a. Connect the digital circuit tester to the fuse and check the continuity.
- 

Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927
- b. If there is no continuity, replace the fuse.
 3. Replace:
 - Blown fuse
 - a. Set the main switch to "OFF".
 - b. Install a new fuse of the correct amperage rating.
 - c. Set on the switches to verify if the electrical circuit is operational.
 - d. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	30.0 A	1
ABS motor	30.0 A	1
ABS solenoid	20.0 A	1
Headlight	10.0 A	1
Signaling system	7.5 A	1
Ignition	10.0 A	1
Fuel injection system	10.0 A	1
Radiator fan motor	10.0 A	1
Accessory	10.0 A	1
ABS control unit	7.5 A	1
Backup	7.5 A	1
Auxiliary	2.0 A	1
Spare	30.0 A	1
Spare	20.0 A	1

Fuses	Amperage rating	Q'ty
Spare	15.0 A	1
Spare	10.0 A	1
Spare	7.5 A	1
Spare	2.0 A	1

EWA13310

WARNING


Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

4. Install:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS31008

REPLACING THE ECU (engine control unit)

1. Turn the main switch to "OFF".
2. Replace the ECU (engine control unit).
Refer to "REMOVING THE ECU (engine control unit)" on page 4-3.
3. Clean the throttle bodies and reset the ISC (Idle speed control) learning value.
Refer to "Cleaning the ISC (idle speed control) valve" on page 7-11.
4. Reset the O₂ feedback learning value. Use the diagnostic code number "87".
Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-38.
5. Check:
 - Engine idling speed
Start the engine, warm it up, and then measure the engine idling speed.

	Engine idling speed 1250–1450 r/min
---------------------------------------------------------------------------------------	------------------------------------------------------

EAS30552

CHECKING AND CHARGING THE BATTERY

Refer to "CHECKING AND CHARGING THE BATTERY" in "BASIC INFORMATION" (separate volume).

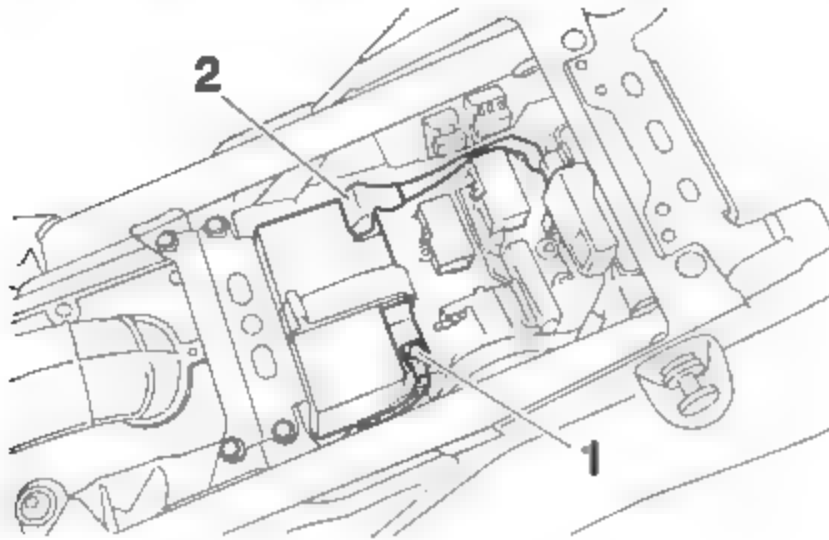
ELECTRICAL COMPONENTS

1. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
2. Disconnect:
 - Battery leads
(from the battery terminals)

ECA13640

NOTICE

First, disconnect the negative battery lead "1", and then positive battery lead "2".

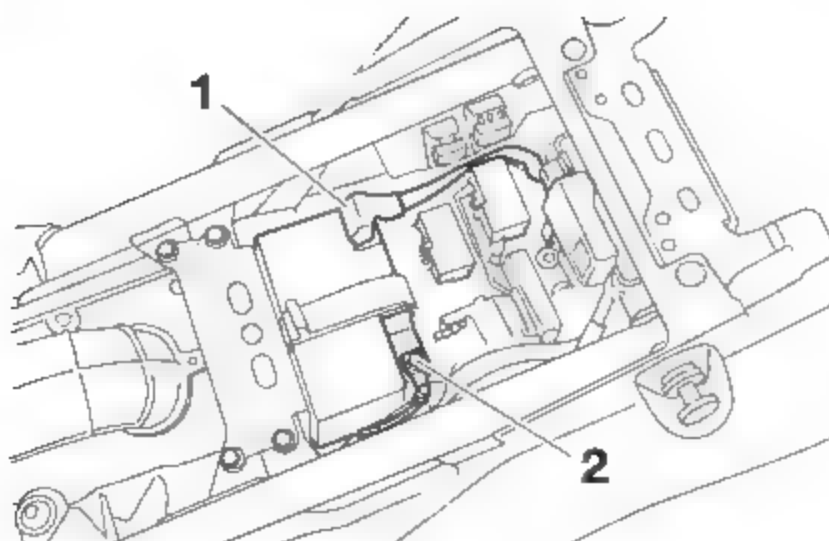


3. Remove:
 - Battery
Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
 - Battery charge
5. Install:
 - Battery
Refer to "GENERAL CHASSIS (1)" on page 4-1.
6. Connect:
 - Battery leads
(to the battery terminals)

ECA13630

NOTICE

First, connect the positive battery lead "1", and then the negative battery lead "2".



7. Check:
 - Battery terminals
Dirt → Clean with a wire brush.
Loose connection → Connect properly.

8. Lubricate:
 - Battery terminals



Recommended lubricant
Dielectric grease

9. Install:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30553

CHECKING THE RELAYS

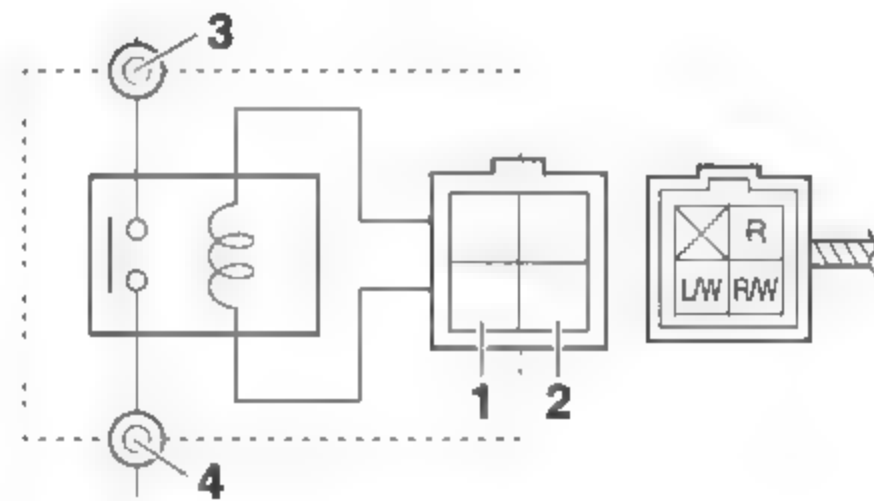
Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, replace the relay.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

1. Disconnect the relay from the wire harness.
2. Connect the digital circuit tester and battery (12 V) to the relay terminal as shown.
Check the relay operation.
Out of specification → Replace.

Starter relay

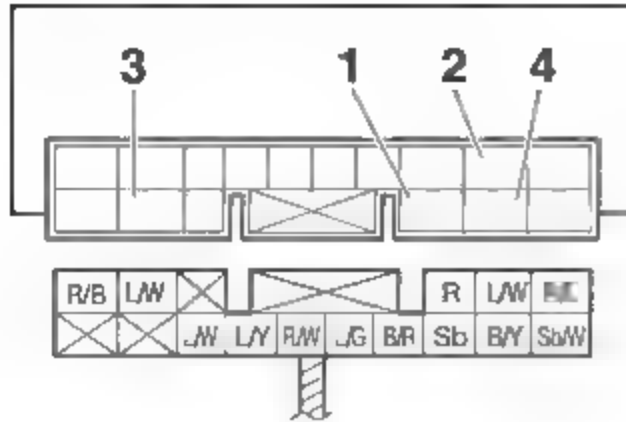


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

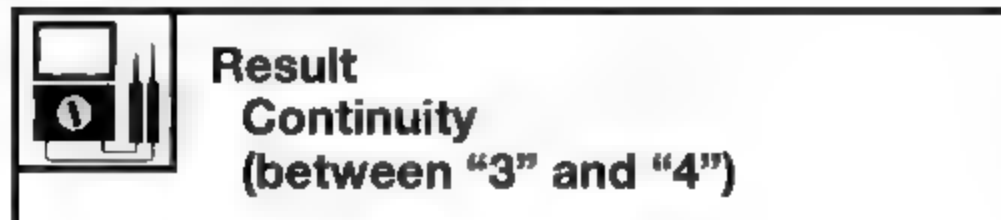


Relay operation
Continuity
(between "3" and "4")

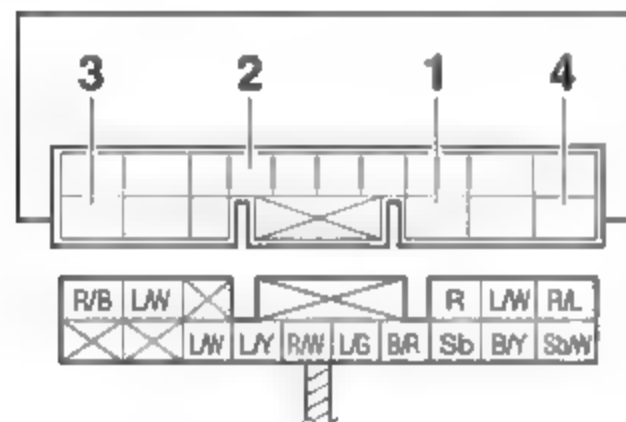
Starting circuit cut-off relay



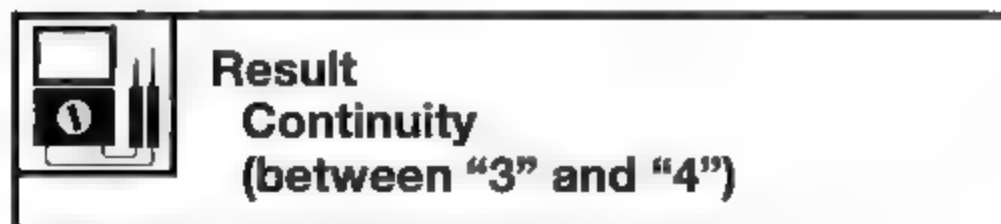
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



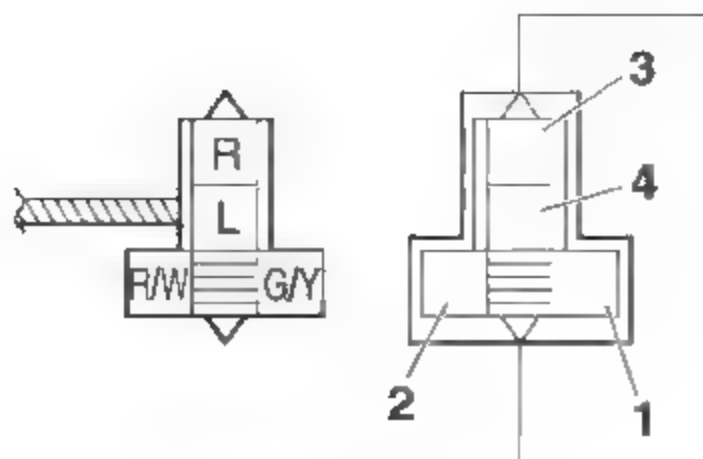
Fuel pump relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



Radiator fan motor relay



1. Positive battery terminal

2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



Result
Continuity
(between "3" and "4")

EAS30555

CHECKING THE DIODE

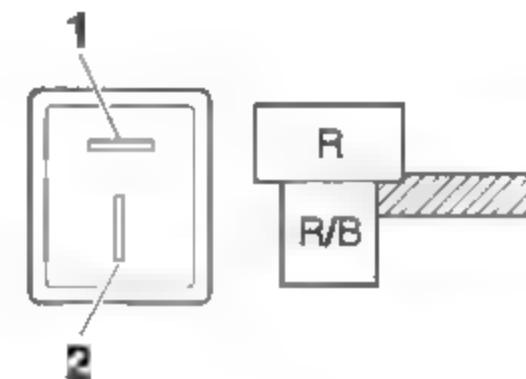
1. Check:
 - Diode
 Out of specification → Replace.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927



Continuity
Positive tester probe
red/black "2"
Negative tester probe
red "1"
No continuity
Positive tester probe
red "1"
Negative tester probe
red/black "2"



- a. Disconnect the diode from the wire harness.
- b. Connect the digital circuit tester to the diode terminals as shown.
- c. Check the diode for continuity.
- d. Check the diode for no continuity.

EAS30796

CHECKING THE RELAY UNIT (DIODE)

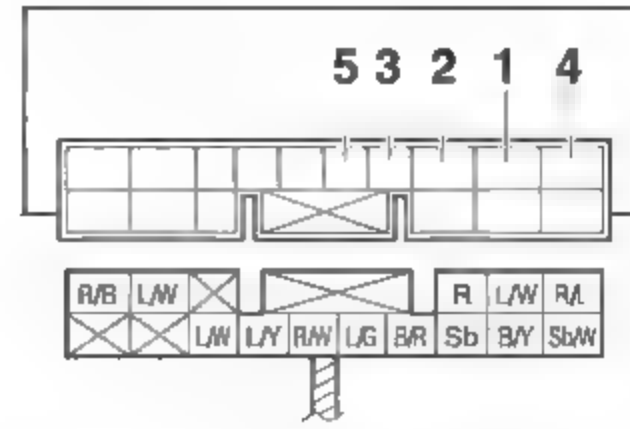
1. Check:
 - Relay unit (diode)
 Out of specification → Replace.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927



Continuity
Positive tester probe
black/yellow "1"
Negative tester probe
sky blue "2"
No continuity
Positive tester probe
sky blue "2"
Negative tester probe
black/yellow "1"
Continuity
Positive tester probe
black/red "3"
Negative tester probe
sky blue "2"
No continuity
Positive tester probe
sky blue "2"
Negative tester probe
black/red "3"
Continuity
Positive tester probe
sky blue/white "4"
Negative tester probe
sky blue "2"
No continuity
Positive tester probe
sky blue "2"
Negative tester probe
sky blue/white "4"
Continuity
Positive tester probe
black/red "3"
Negative tester probe
blue/green "5"
No continuity
Positive tester probe
blue/green "5"
Negative tester probe
black/red "3"



- Disconnect the relay unit coupler from the relay unit.
- Connect the digital circuit tester to the relay unit terminal as shown.
- Check the relay unit (diode) for continuity.
- Check the relay unit (diode) for no continuity.

EAS30658

CHECKING THE IGNITION COILS

The following procedure applies to all of the ignition coils.

- Check:
 - Primary coil resistance
 Out of specification → Replace.



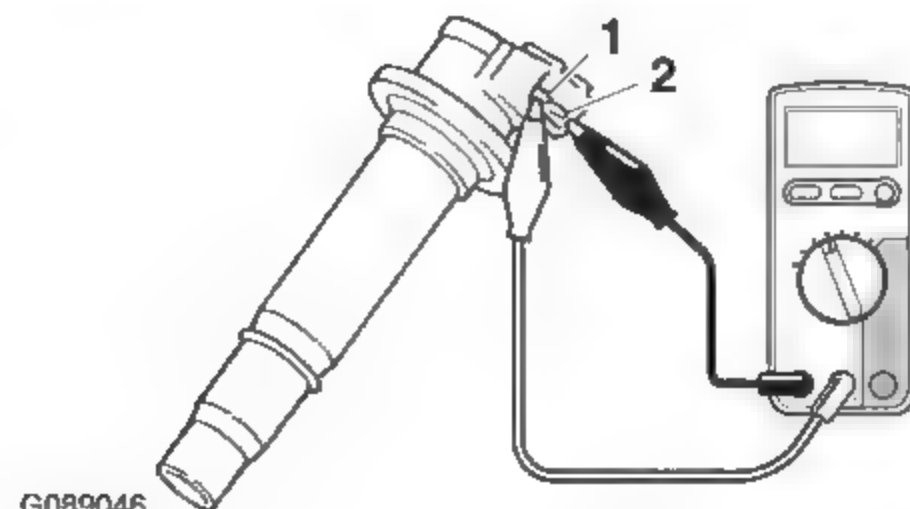
Primary coil resistance
1.19–1.61 Ω

- Disconnect the ignition coil coupler from the ignition coil.
- Connect the digital circuit tester to the ignition coil as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

- Positive tester probe
Ignition coil terminal "1"
- Negative tester probe
Ignition coil terminal "2"



G089046

- Measure the primary coil resistance.

2. Check:

- Secondary coil resistance
Out of specification → Replace.



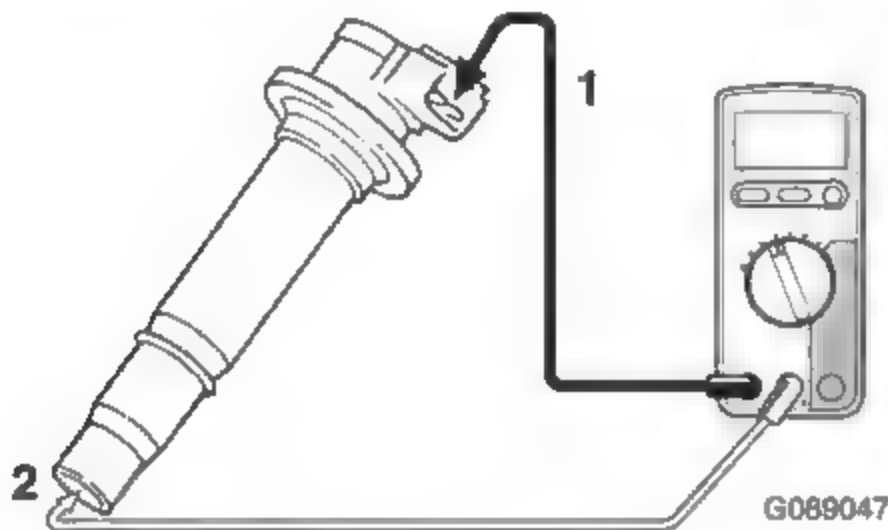
Secondary coil resistance
8.50–11.50 kΩ

- Connect the digital circuit tester to the ignition coil as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Negative tester probe
Ignition coil terminal “1”
- Positive tester probe
Spark plug terminal “2”



- Measure the secondary coil resistance.

EAS30560

CHECKING THE IGNITION SPARK GAP

1. Check:

- Ignition spark gap
Out of specification → Perform the ignition system troubleshooting, starting with step 5. Refer to “TROUBLESHOOTING” on page 8-4.



Minimum ignition spark gap
0.6 mm (0.24 in)

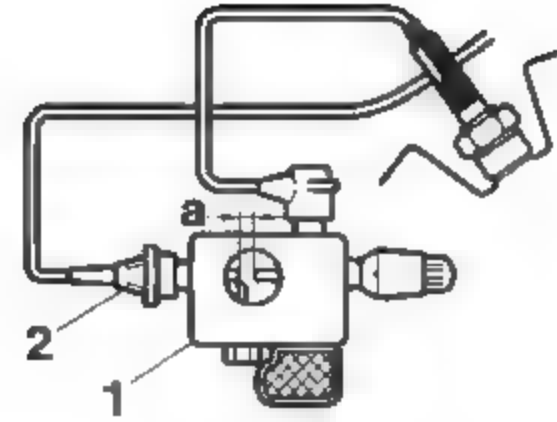
TIP

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

- Remove the ignition coil from the spark plug.
- Connect the ignition checker “1” as shown.



Ignition checker
90890-06754
Oppama pet-4000 spark checker
YM-34487



G089051

2. Ignition coil

- Turn the main switch to “ON”.
- Measure the ignition spark gap “a”.
- Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.

EAS30580

CHECKING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:

- Crankshaft position sensor coupler
(from the wire harness)

2. Check:

- Crankshaft position sensor resistance
Out of specification → Replace the crankshaft position sensor.



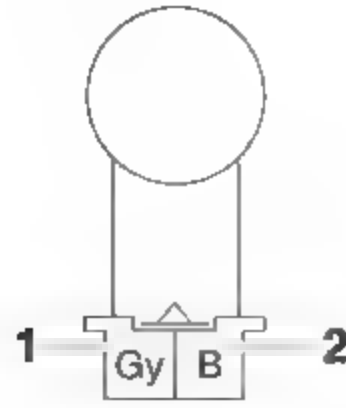
Crankshaft position sensor resistance
228–342 Ω

- Connect the digital circuit tester to the crankshaft position sensor coupler as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe
gray “1”
- Negative tester probe
black “2”



- b. Measure the crankshaft position sensor resistance.

EAS30561

CHECKING THE LEAN ANGLE SENSOR

1. Remove:
 - Lean angle sensor (from the battery box.)
2. Check:
 - Lean angle sensor output voltage
 Out of specification → Replace.



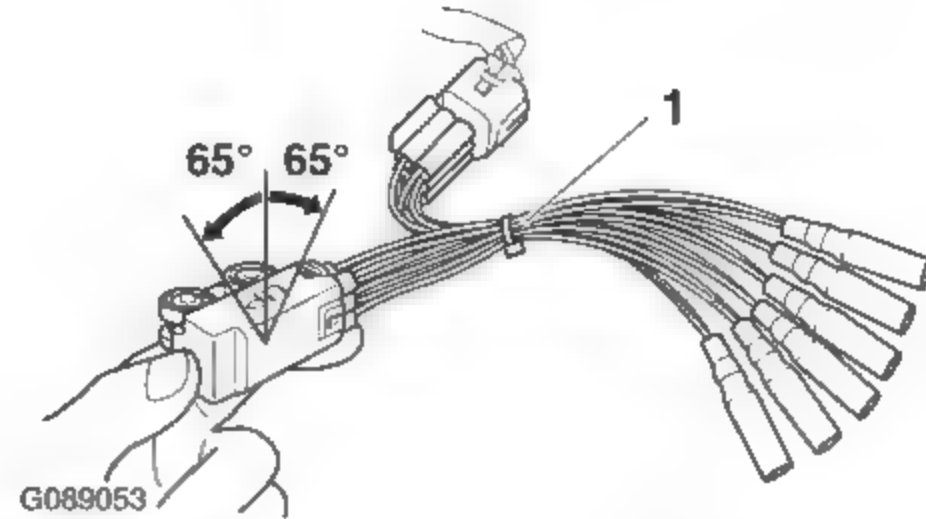
Lean angle sensor
Operating angle
 65 °
Output voltage up to operating angle
 0.4–1.4 V
Output voltage over operating angle
 3.7–4.4 V

- a. Connect the test harness– lean angle sensor (6P) “1” to the lean angle sensor and wire harness as shown.
- b. Connect the digital circuit tester to the test harness– lean angle sensor (6P).



Digital circuit tester (CD732)
 90890-03243
Model 88 Multimeter with tachometer
 YU-A1927
Test harness– lean angle sensor (6P)
 90890-03209
Test harness– lean angle sensor (6P)
 YU-03209

- Positive tester probe yellow (test harness color)
- Negative tester probe blue (test harness color)



- c. Set the main switch to “ON”.
- d. Turn the lean angle sensor to 65°.
- e. Measure the lean angle sensor output voltage.

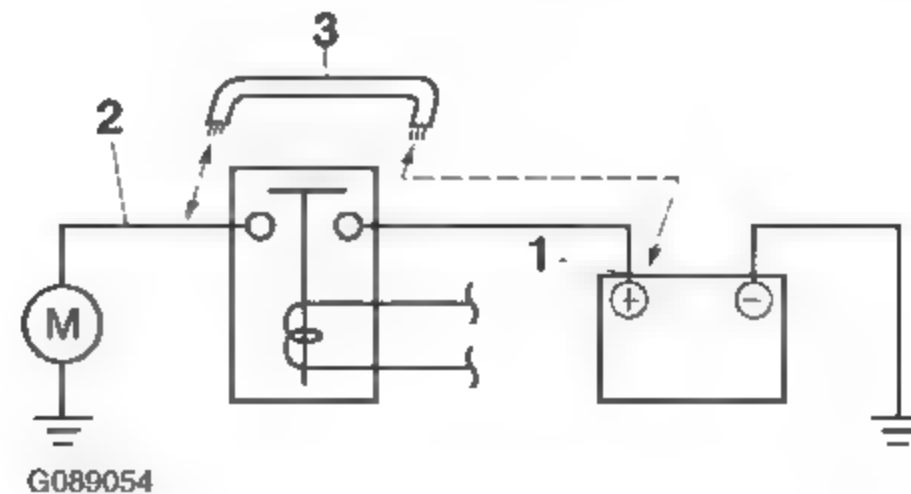
CHECKING THE STARTER MOTOR OPERATION

1. Check:
 - Starter motor operation
 Does not operate → Perform the electric starting system troubleshooting, starting with step 4.
 Refer to “TROUBLESHOOTING” on page 8-10.
 - a. Connect the positive battery terminal “1” and starter motor lead “2” with a jumper lead “3”.

EWA13810

WARNING

- A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.



- b. Check the starter motor operation.

EAS30566

CHECKING THE STATOR COIL

1. Disconnect:
 - Stator coil coupler (from the rectifier/regulator)

2. Check:

- Stator coil
 - a. Connect the digital circuit tester to the stator coil coupler as shown.

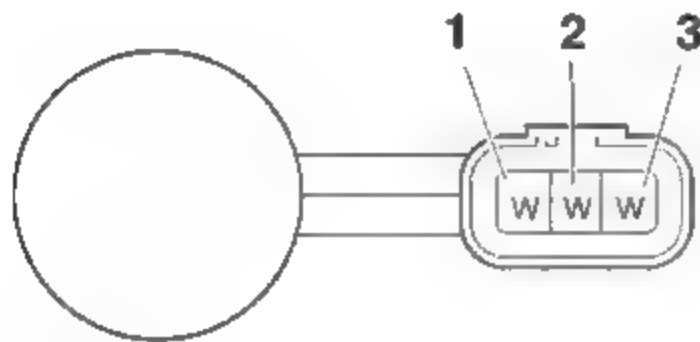


Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

- Positive tester probe
white "1"
- Negative tester probe
white "2"

- Positive tester probe
white "1"
- Negative tester probe
white "3"

- Positive tester probe
white "2"
- Negative tester probe
white "3"



- b. Check the stator coil continuity.
- c. If there is no continuity, replace the stator coil.

EAS30880

CHECKING THE RECTIFIER/REGULATOR

1. Check:

- Charging voltage
Out of specification → Replace the rectifier/regulator.



Standard output
14.0 V, 29.3 A at 5000 r/min

- a. Connect the digital circuit tester to the battery terminals as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

- Positive tester probe
Positive battery terminal
- Negative tester probe
Negative battery terminal

- b. Start the engine and let it run at approximately 5000 r/min.
- c. Measure the charging voltage.

EAS30573

CHECKING THE FUEL SENDER

1. Disconnect:

- Fuel pump coupler
(from the fuel pump)

2. Remove:

- Fuel tank

3. Remove:

- Fuel pump
(from the fuel tank)

4. Check:

- Fuel sender resistance
Out of specification → Replace the fuel pump assembly.



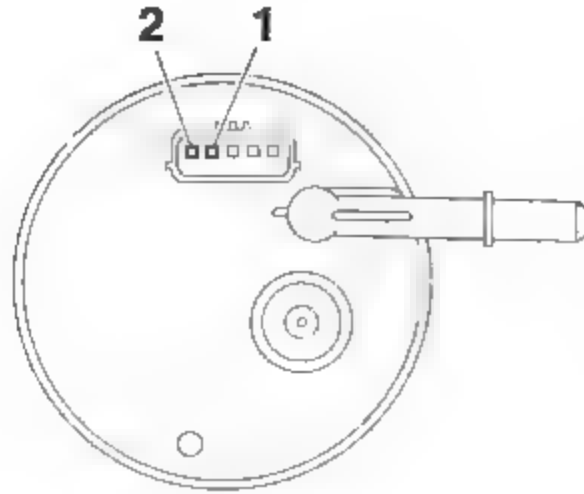
Sender unit resistance (full)
12.0–15.0 Ω
Sender unit resistance (empty)
118.0–122.0 Ω

- a. Connect the digital circuit tester to the fuel sender terminals as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

- Positive tester probe
Fuel pump terminal "1"
- Negative tester probe
Fuel pump terminal "2"



- b. Move the fuel sender float to minimum and maximum level position.
- c. Measure the fuel sender resistance.

EAS31572

CHECKING THE FUEL METER

This model is equipped with a self-diagnosis device for the fuel level detection circuit.

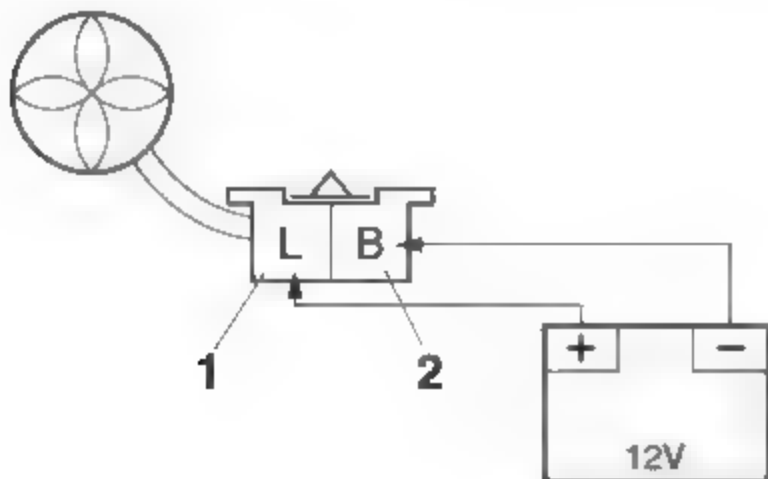
1. Check:
 - Fuel meter
(Turn the main switch to "ON".)
Fuel meter comes on for a few seconds, then goes off → Fuel meter is OK.
Fuel meter does not come on → Replace the meter assembly.
Fuel meter segments flash repeatedly → Replace the fuel pump assembly.

EAS30577

CHECKING THE RADIATOR FAN MOTOR

1. Check:
 - Radiator fan motor
Faulty/rough movement → Replace.
 - a. Disconnect the radiator fan motor coupler from the wire harness.
 - b. Connect the battery (DC 12 V) as shown.

- Positive tester probe blue "1"
- Negative tester probe black "2"



- c. Check the radiator fan motor movement.

EAS30578

CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
 - Coolant temperature sensor
Refer to "THROTTLE BODIES" on page 7-6.

EWA14130

WARNING

- Handle the coolant temperature sensor with special care.
- Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.

2. Check:
 - Coolant temperature sensor resistance
Out of specification → Replace.



Coolant temperature sensor resistance

2513–2777 Ω at 20 °C (2513–2777 Ω at 68 °F)

Coolant temperature sensor resistance

210–221 Ω at 100 °C (210–221 Ω at 212 °F)

- a. Connect the digital circuit tester to the coolant temperature sensor as shown.



Digital circuit tester (CD732)

90890-03243

Model 88 Multimeter with tachometer

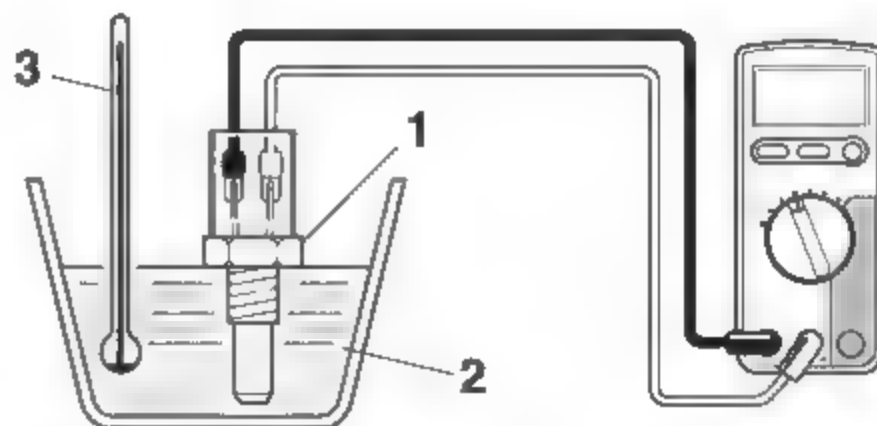
YU-A1927

- b. Immerse the coolant temperature sensor "1" in a container filled with coolant "2".

TIP

Make sure the coolant temperature sensor terminals do not get wet.

- c. Place a thermometer "3" in the coolant.



G089056

- d. Heat the coolant or let it cool down to the specified temperatures.

- e. Measure the coolant temperature sensor resistance.

3. Install:

- Coolant temperature sensor
(along with the gasket **New**)



Coolant temperature sensor
15 N·m (1.5 kgf·m, 11 lb·ft)

EAS30581

CHECKING THE THROTTLE POSITION SENSOR

1. Remove:

- Throttle position sensor
(from the throttle body)

EWA16690

WARNING

- Handle the throttle position sensor with special care.
- Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

2. Check:

- Throttle position sensor maximum resistance
Out of specification → Replace the throttle position sensor.



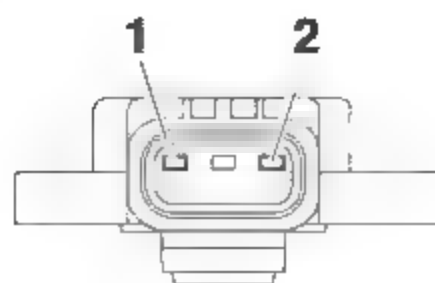
Resistance
2.64–6.16 kΩ

- a. Connect the digital circuit tester to the throttle position sensor as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe
Sensor terminal "1"
- Negative tester probe
Sensor terminal "2"



- b. Check the throttle position sensor maximum resistance.

3. Install:

- Throttle position sensor

TIP

When installing the throttle position sensor, adjust its angle properly. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-12.

EAS30593

CHECKING THE INTAKE AIR PRESSURE SENSOR

1. Check:

- Intake air pressure sensor output voltage
Out of specification → Replace.



Intake air pressure sensor output voltage
3.59–3.67 V at 101.3 kPa (3.59–3.67 V at 1.01 kgf/cm², 3.59–3.67 V at 14.7 psi)

- a. Connect the test harness S– pressure sensor (3P) "1" to the intake air pressure sensor and wire harness as shown.

ECA20920

NOTICE

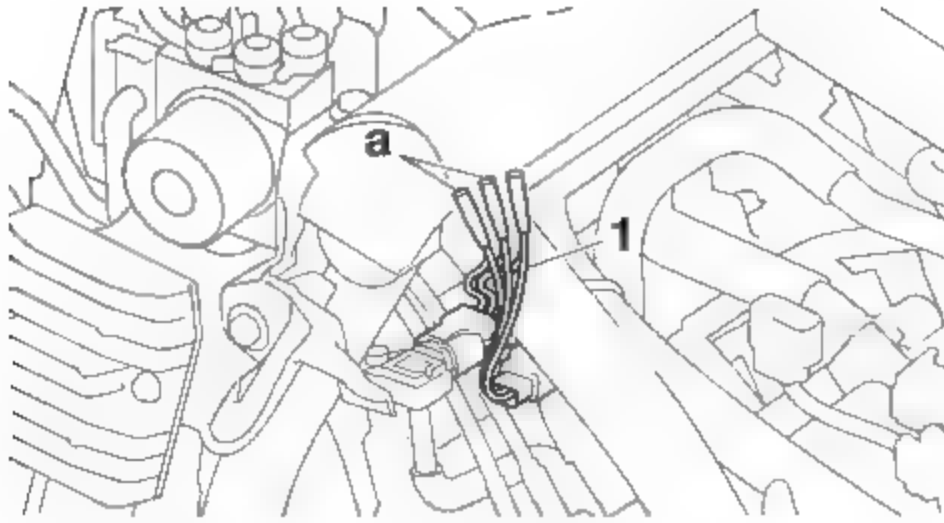
Pay attention to the installing direction of the test harness S– pressure sensor (3P) coupler.

- b. Connect the digital circuit tester to the test harness S– pressure sensor (3P) "a".



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927
Test harness S– pressure sensor (3P)
90890-03207
Test harness S– pressure sensor (3P)
YU-03207

- Positive tester probe
pink (test harness color)
- Negative tester probe
brown (test harness color)



- c. Set the main switch to "ON".
- d. Measure the intake air pressure sensor output voltage.

EAS30594

CHECKING THE INTAKE AIR TEMPERATURE SENSOR

1. Remove:

- Intake air temperature sensor
Refer to "GENERAL CHASSIS (4)" on page 4-8.

EWA14110

! WARNING

- Handle the intake air temperature sensor with special care.
- Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.

2. Check:

- Intake air temperature sensor resistance
Out of specification → Replace.



Intake air temperature sensor resistance
5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F)
Intake air temperature sensor resistance
290–390 Ω at 80 °C (290–390 Ω at 176 °F)

- a. Connect the digital circuit tester to the intake air temperature sensor terminal as shown.



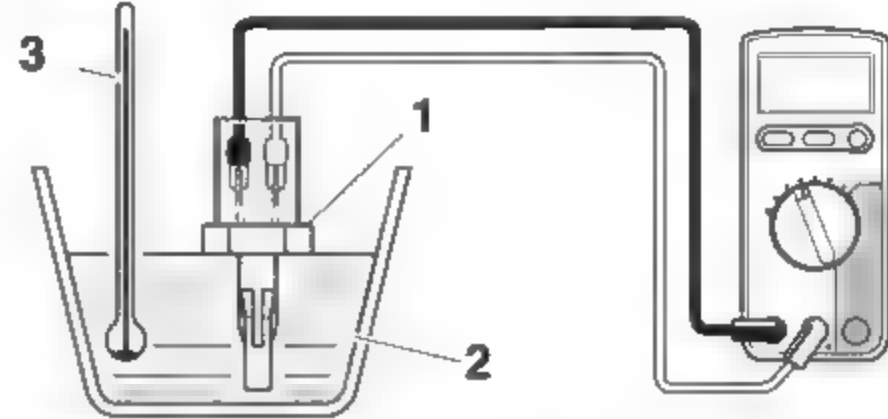
Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- b. Immerse the intake air temperature sensor "1" in a container filled with water "2".

TIP

Make sure that the intake air temperature sensor terminals do not get wet.

- c. Place a thermometer "3" in the water.



G089057

- d. Slowly heat the water, then let it cool down to the specified temperature.
- e. Measure the intake air temperature sensor resistance.

3. Install:

- Intake air temperature sensor
Refer to "GENERAL CHASSIS (4)" on page 4-8.



Intake air temperature sensor bolt
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)

EAS31058

CHECKING THE GEAR POSITION SWITCH

1. Remove:

- Drive sprocket cover
Refer to "CHAIN DRIVE" on page 4-87.
- Gear position switch
Refer to "CRANKCASE" on page 5-70.

2. Check:

- Gear position switch
Out of specification → Replace the gear position switch.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927



Result

Neutral position

Continuity

Positive tester probe
sky blue "1"

Negative tester probe
Switch terminal "a"

1st position

Continuity

Positive tester probe
pink "2"

Negative tester probe
Switch terminal "b"

2nd position

Continuity

Positive tester probe
white "3"

Negative tester probe
Switch terminal "c"

3rd position

Continuity

Positive tester probe
gray "4"

Negative tester probe
Switch terminal "d"

4th position

Continuity

Positive tester probe
orange "5"

Negative tester probe
Switch terminal "e"

5th position

Continuity

Positive tester probe
white/red "6"

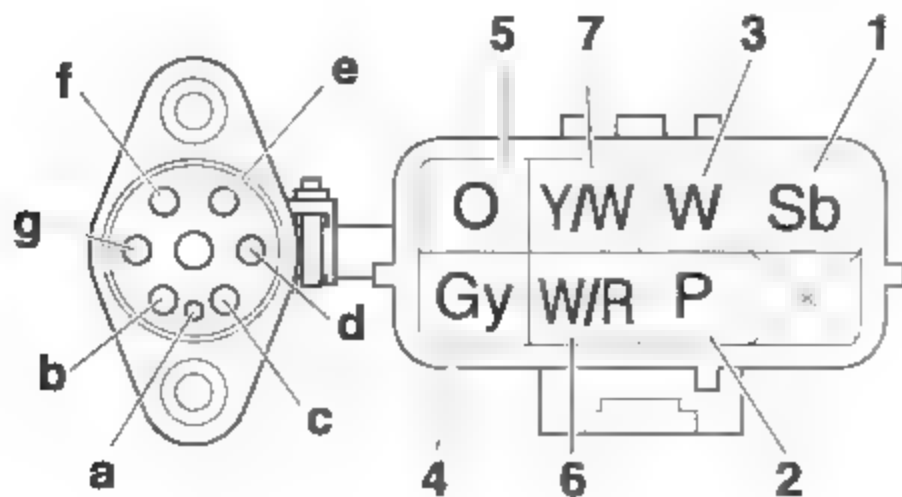
Negative tester probe
Switch terminal "f"

6th position

Continuity

Positive tester probe
yellow/white "7"

Negative tester probe
Switch terminal "g"



EAS30881

CHECKING THE FUEL INJECTORS

The following procedure applies to all of the fuel injectors.

1. Remove:

- Fuel injector

Refer to "THROTTLE BODIES" on page 7-6.

2. Check:

- Fuel injector resistance

Out of specification → Replace the fuel injector.



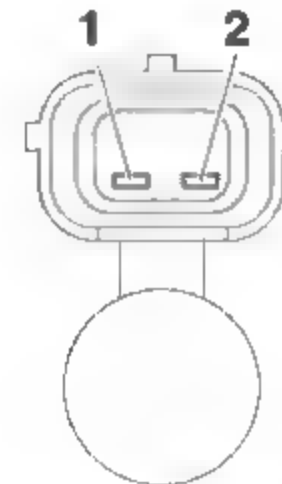
Resistance
12.0 Ω

- Disconnect the fuel injector coupler from the fuel injector.
- Connect the digital circuit tester to the fuel injector coupler as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

- Positive tester probe
Fuel injector terminal "1"
- Negative tester probe
Fuel injector terminal "2"



- Measure the fuel injector resistance.

EAS32804

CHECKING THE PURGE CUT VALVE SOLENOID

1. Check:

- Purge cut valve solenoid resistance
- Out of specification → Replace.



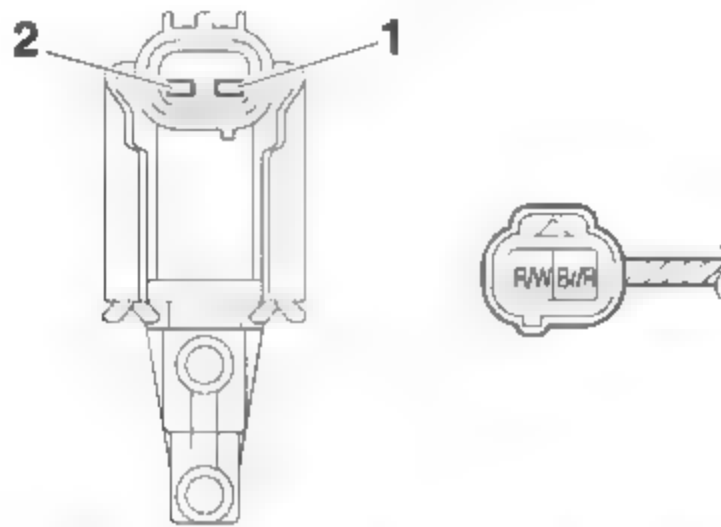
Solenoid resistance
22-26 Ω

- Disconnect the purge cut valve solenoid coupler from the wire harness.

- b. Connect the digital circuit tester to the purge cut valve solenoid terminals as shown.



- Positive tester probe →
Purge cut valve solenoid terminal "1"
- Negative tester probe →
Purge cut valve solenoid terminal "2"



- c. Measure the purge cut valve solenoid resistance.

SELF DIAGNOSTIC

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EAS20437

SELF-DIAGNOSTIC FUNCTION

EAS33142

GLOSSARY

Word	Description
MIL (Malfunction indicator light)	MIL is an indicator light that comes on when a control unit determines a malfunction.
DTC (Diagnostic trouble code)	DTC is a code that is saved within a control unit's memory when the control unit determines a malfunction.
Pending DTC (Pending diagnostic trouble code)	Pending DTC is a code that is saved within a control unit's memory when the control unit detects an abnormal condition. If the abnormal condition continues, a malfunction may be determined.
Driving cycle	Driving cycle is the duration from the main switch being turned on, OBD requirements are met, and until the main switch is turned off.
FFD (Freeze frame data)	FFD is the data of all signal sensors saved at the moment a malfunction is determined.
Current malfunction	A DTC for an unrecovered, current malfunction.
Recovered malfunction	A DTC for a previously determined but now recovered malfunction.
Pending abnormality	Abnormal condition that is detected but not yet determined to be a malfunction.
Threshold	Threshold is a point set to detect if the output from sensors are abnormal or not.
OBD (On-board diagnostics)	Self-diagnostic system is equipped in a control unit for the emission control system.
GST (Generic scan tool)	Generic diagnostic tool that complies with OBD standards.
YDT (Yamaha diagnostic tool)	Diagnostic tool developed especially for Yamaha vehicles.

EAS32858

OUTLINE

The control unit is equipped with a self-diagnostic function in order to ensure that the system is operating normally. If this function detects a malfunction in the system, it immediately operates the system under substitute characteristics and illuminates the warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a DTC is stored in the memory of the control unit.

EAS32859

CHECKING THE WARNING LIGHT

The warning light comes on after the main switch has been set to "ON". Refer to the following table for lighting up time.

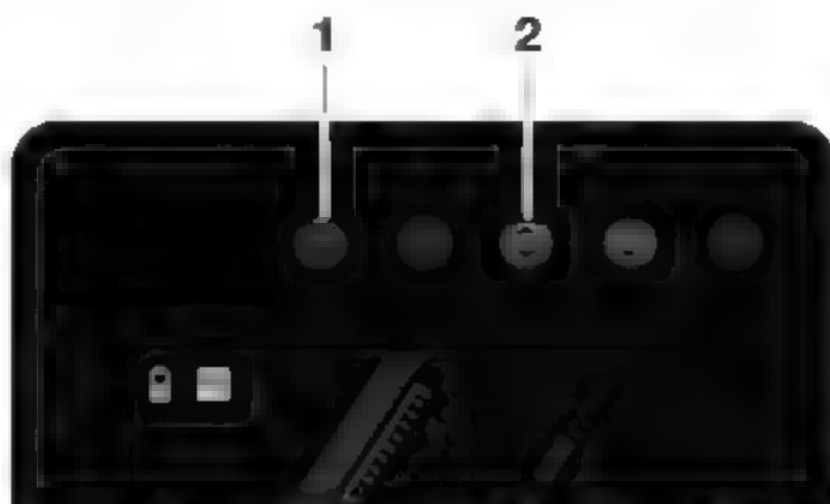
If the warning light still comes on, refer to a check item of a troubleshooting of each system, check and repair it. If the warning light does not come on, the warning light (LED) may be defective.

TIP

- This engine equips self-diagnostic function. It's controlled delicately for detecting defective and malfunction of the exhaust emission control system. Therefore, the vehicle modifying, poor maintenance, and improper using of the vehicle may also become the cause of the MIL come on. These events may cause the occurrence of the warning light coming on without malfunction.
- Reprogramming of the ECU software.
- Using the electrical accessory which may affect the ECU.
- Using the incorrect specification of spark plug and fuel injector. Using the third party accessories such as exhaust system.

SELF-DIAGNOSTIC FUNCTION

- Change of specifications of drive chain, sprocket, wheel and tire.
- Removing or modifying the O₂ sensor, the exhaust system part (catalyst, etc.).
- Poor maintenance of the drive chain and tire air pressure.
- Incorrect brake pedal height, rear brake dragging.
- Excessive opening and closing of the throttle grip, frequently used of burnout, wheelie and half clutch.
- Air mixture by fuel supply badness.



System	Lighting up warning light	Lighting time
FUEL INJECTION SYSTEM	MIL "1" (comes on in amber)	2.0 seconds
ABS (Anti-lock Brake System)	ABS warning light "2"	*

TIP

*: The ABS warning light goes off when the vehicle is judged to normal with running.

EAS32908

YDT

This model uses the YDT to identify malfunctions.

For information about using the YDT, refer to the operation manual that is included with the tool.

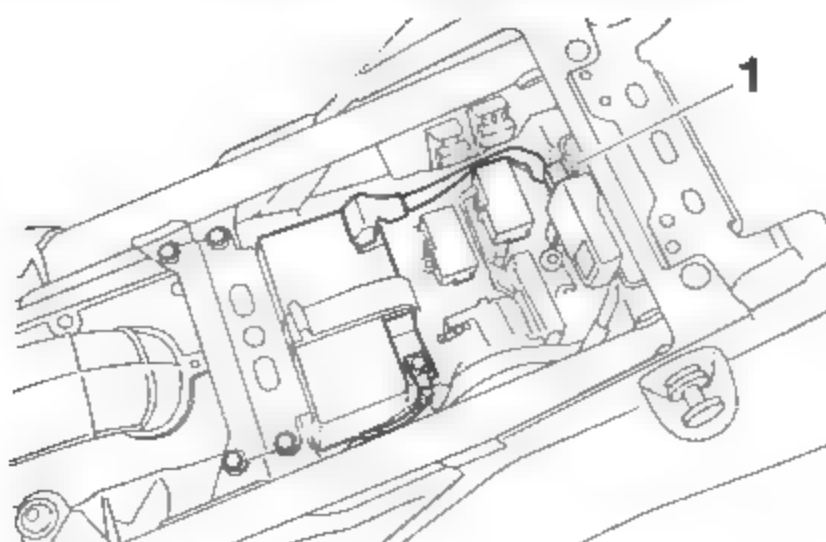
	Yamaha diagnostic tool USB (US) 90890-03269 Yamaha diagnostic tool (A/I) 90890-03273
-------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------

TIP

- Yamaha diagnostic tool (A/I) (90890-03273) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.
- A GST can also be used to identify malfunctions.

Connecting the YDT

Disconnect the coupler "1" from the CCU, and then connect the YDT to the coupler.



SELF-DIAGNOSTIC FUNCTION

EAS32864

PARTS CONNECTED TO THE ECU

The following parts are connected to the ECU.

When checking for a power short circuit, the couplers must be disconnected from all of the following parts beforehand.

- Crankshaft position sensor
- Fuel injector #1
- Fuel injector #2
- Ignition coil #1
- Ignition coil #2
- Throttle position sensor
- Intake air pressure sensor
- Coolant temperature sensor
- Lean angle sensor
- Intake air temperature sensor
- O₂ sensor
- Hydraulic unit assembly (ABS ECU)
- Relay unit (diode)
- Headlight assembly
- Radiator fan motor relay
- Meter assembly
- ISC (Idle Speed Control) unit
- Purge cut valve solenoid

EAS32918

PARTS CONNECTED TO THE ABS ECU

The following parts are connected to the hydraulic unit assembly (ABS ECU).

When checking for a power short circuit, the couplers must be disconnected from all of the following parts beforehand.

- Meter assembly
- ECU (Engine Control Unit)
- Front wheel sensor
- Rear wheel sensor
- Handlebar switch (right)
- Rear brake light switch
- Tail/brake light

EAS33137

PRECAUTIONS FOR ROAD TEST

EWA20880



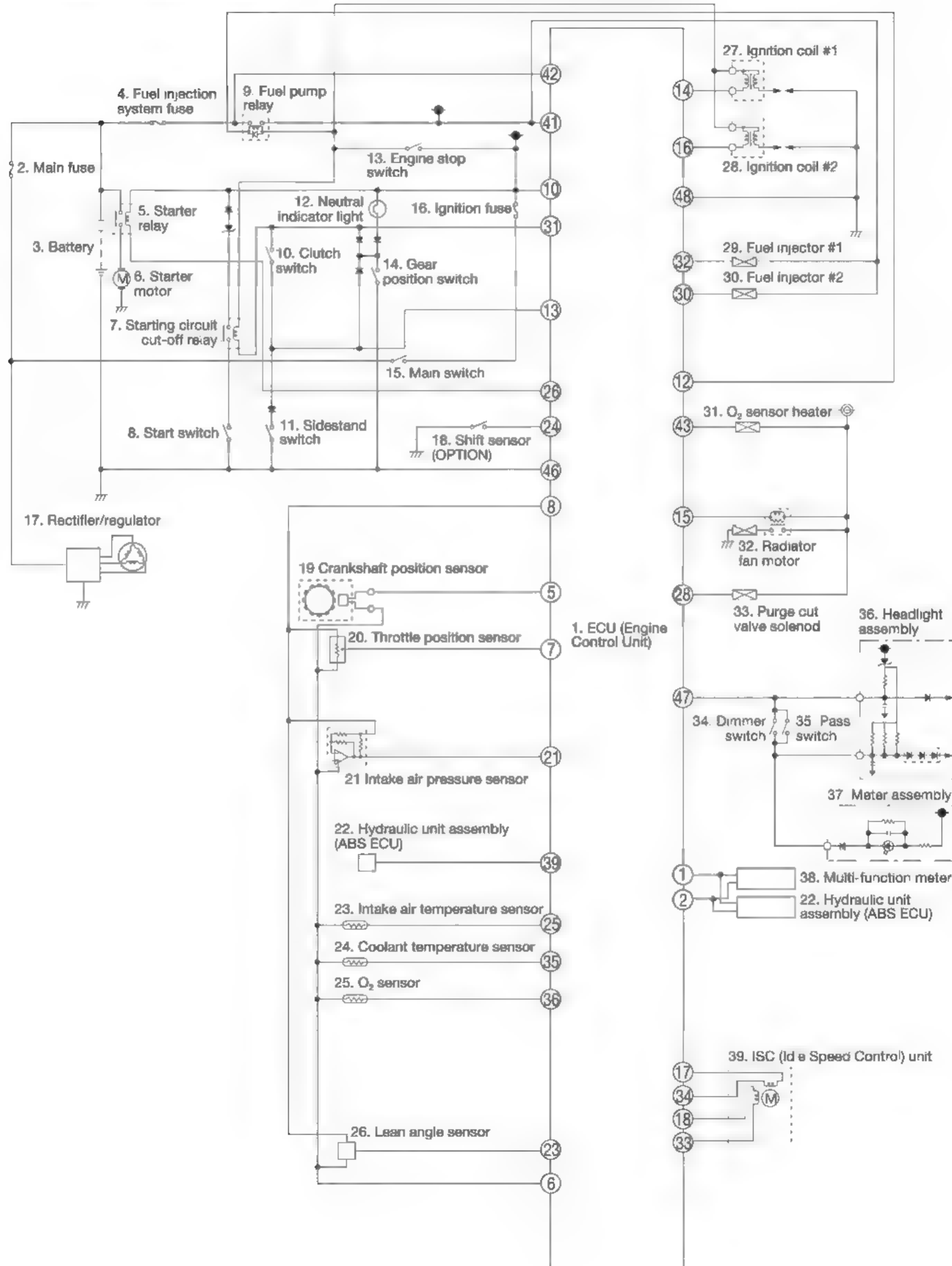
When test riding the vehicle, always comply with local traffic regulations.

EAS20387

SYSTEM DIAGRAM

EAS32820

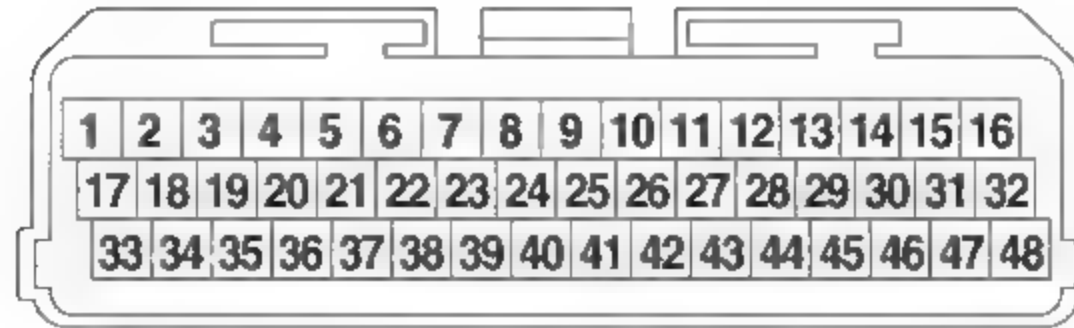
ECU CIRCUIT DIAGRAM



1. ECU (Engine Control Unit)
2. Main fuse
3. Battery
4. Fuel injection system fuse
5. Starter relay
6. Starter motor
7. Starting circuit cut-off relay
8. Start switch
9. Fuel pump relay
10. Clutch switch
11. Sidestand switch
12. Neutral indicator light
13. Engine stop switch
14. Gear position switch
15. Main switch
16. Ignition fuse
17. Rectifier/regulator
18. Shift sensor (OPTION)
19. Crankshaft position sensor
20. Throttle position sensor
21. Intake air pressure sensor
22. Hydraulic unit assembly (ABS ECU)
23. Intake air temperature sensor
24. Coolant temperature sensor
25. O₂ sensor
26. Lean angle sensor
27. Ignition coil #1
28. Ignition coil #2
29. Fuel injector #1
30. Fuel injector #2
31. O₂ sensor heater
32. Radiator fan motor
33. Purge cut valve solenoid
34. Dimmer switch
35. Pass switch
36. Headlight assembly
37. Meter assembly
38. Multi-function meter
39. ISC (Idle Speed Control) unit

EAS33369

ECU COUPLER LAYOUT



No.	Connected parts	Wire harness color
1	CAN communication circuit	L/R
2	CAN communication circuit	L/B
3	—	—
4	—	—
5	Crankshaft position sensor	Gy
6	O ₂ sensor, throttle position sensor, intake air temperature sensor, coolant temperature sensor, intake air pressure sensor, lean angle sensor, crankshaft position sensor	B/L
7	Throttle position sensor	W
8	Throttle position sensor, intake air pressure sensor, lean angle sensor	L
9	—	—
10	Ignition fuse, O ₂ sensor heater, purge cut valve solenoid, starter relay, relay unit (diode), fuel pump relay	R/W
11	—	—
12	Fuel pump relay	L/Y
13	Main switch	B/R
14	Ignition coil #1	O
15	Radiator fan motor relay	G/Y
16	Ignition coil #2	Gy/R
17	ISC (Idle Speed Control) unit	W/G

No.	Connected parts	Wire harness color
18	ISC (Idle Speed Control) unit	Br/L
19	—	—
20	—	—
21	Intake air pressure sensor	P/W
22	—	—
23	Lean angle sensor	Y/G
24	Shift sensor (OPTION)	V
25	Intake air temperature sensor	Br/W
26	Starter relay, starting circuit cut-off relay, relay unit (diode)	L/W
27	—	—
28	Purge cut valve solenoid	Br/R
29	—	—
30	Fuel injector #2	G/B
31	Relay unit (diode), starting circuit cut-off relay, clutch switch	B/Y
32	Fuel injector #1	R/B
33	ISC (Idle Speed Control) unit	P/L
34	ISC (Idle Speed Control) unit	R/G
35	Coolant temperature sensor	G/W
36	O ₂ sensor	Gy/G
37	—	—
38	—	—
39	Hydraulic unit assembly (ABS ECU)	W/Y
40	—	—

SYSTEM DIAGRAM

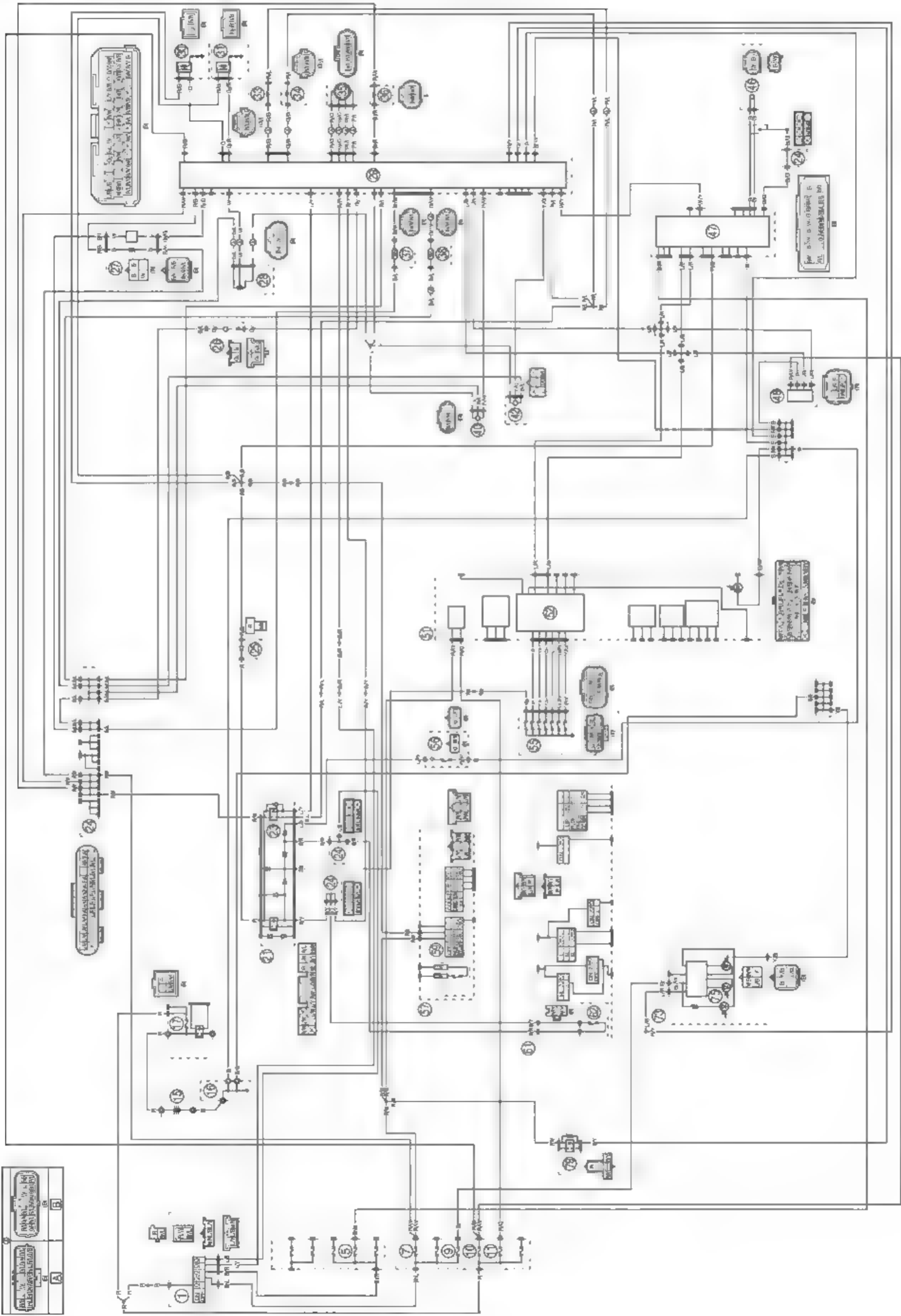
No.	Connected parts	Wire harness color
41	Fuel injector #1, fuel injector #2, fuel pump relay, fuel pump	R/L
42	Fuel injection system fuse	R/B
43	O ₂ sensor heater	P/B
44	—	—
45	—	—
46	Ground	B/W
47	Headlight assembly, dimmer switch, pass switch	R/Y
48	Ground	B

EAS20440

FUEL INJECTION SYSTEM

EAS32871

CIRCUIT DIAGRAM



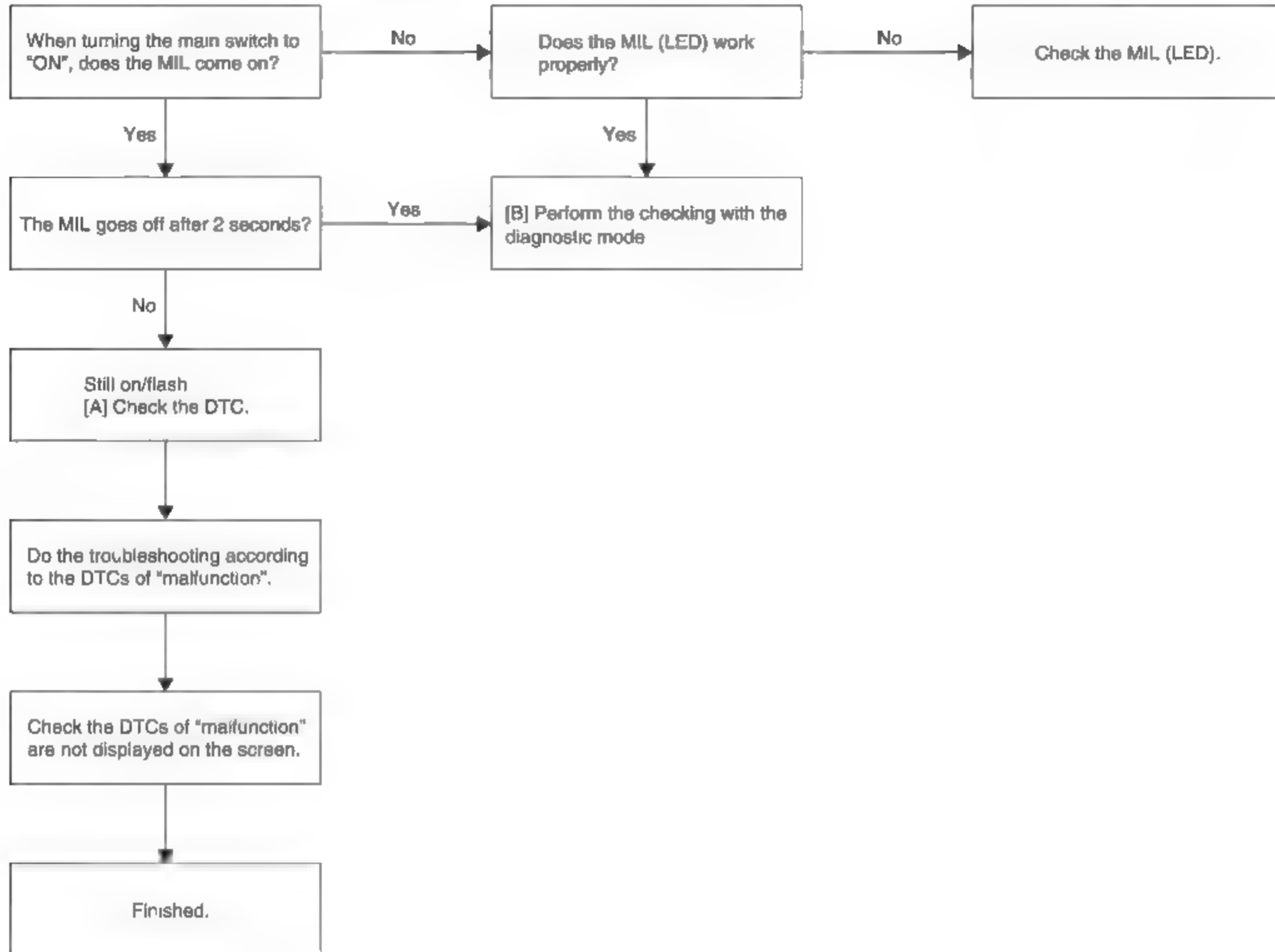
- 1. Main switch
- 5. ABS control unit fuse
- 7. Ignition fuse
- 9. Headlight fuse
- 10. Fuel injection system fuse
- 11. Backup fuse
- 15. Battery
- 16. Engine ground
- 17. Main fuse
- 21. Relay unit (diode)
- 23. Fuel pump relay
- 24. Joint coupler
- 25. Diode
- 26. Crankshaft position sensor
- 27. O₂ sensor
- 28. Throttle position sensor
- 29. ECU (Engine Control Unit)
- 30. Ignition coil #1
- 31. Ignition coil #2
- 33. Fuel injector #1
- 34. Fuel injector #2
- 35. ISC (Idle Speed Control) unit
- 36. Purge cut valve solenoid
- 37. Intake air temperature sensor
- 38. Coolant temperature sensor
- 40. Intake air pressure sensor
- 42. Lean angle sensor
- 46. Rear wheel sensor
- 47. ABS ECU
- 48. YDT coupler
- 51. Meter assembly
- 52. Multi-function meter
- 55. Gear position switch
- 56. Sidestand switch
- 57. Handlebar switch (right)
- 59. Stop/run/start switch
- 61. Handlebar switch (left)
- 62. Clutch switch
- 73. Headlight assembly
- 75. Headlight (low beam)
- 79. Radiator fan motor relay
- A. Wire harness
- B. Sub-wire harness

EAS32817

BASIC PROCESS FOR TROUBLESHOOTING

This section describes the basic process about fuel injection system troubleshooting.

But because a work procedure varies depending to symptom and DTC, check and repair it according to applicable troubleshooting.



EAS33147

[A] THE MIL COMES ON/FLASHES AND ENGINE OPERATION IS NOT NORMAL

1. Check the DTC of "malfunction" using the YDT.
2. Check and repair the malfunction according to applicable DTC troubleshooting.
3. Turn the main switch from "OFF" to "ON", and then check the DTC of "malfunction" is not displayed.

TIP

- If another DTC is displayed, repeat steps (1) to (3) until no DTC is displayed.
- Turning the main switch to "OFF" will not erase the malfunction history.

EAS33148

[B] THE MIL DOES NOT COME ON, BUT THE ENGINE OPERATION IS NOT NORMAL

1. Monitor the operation of these sensors and actuators by using the YDT in the diagnostic mode.
Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-38 and "DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE" on page 9-40.

01: Throttle position sensor signal (throttle angle)
30: Cylinder-#1 ignition coil
31: Cylinder-#2 ignition coil
36: Fuel injector #1
37: Fuel injector #2

If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.

If no malfunction is detected in the sensors and actuators, check and repair the inner parts of the engine.

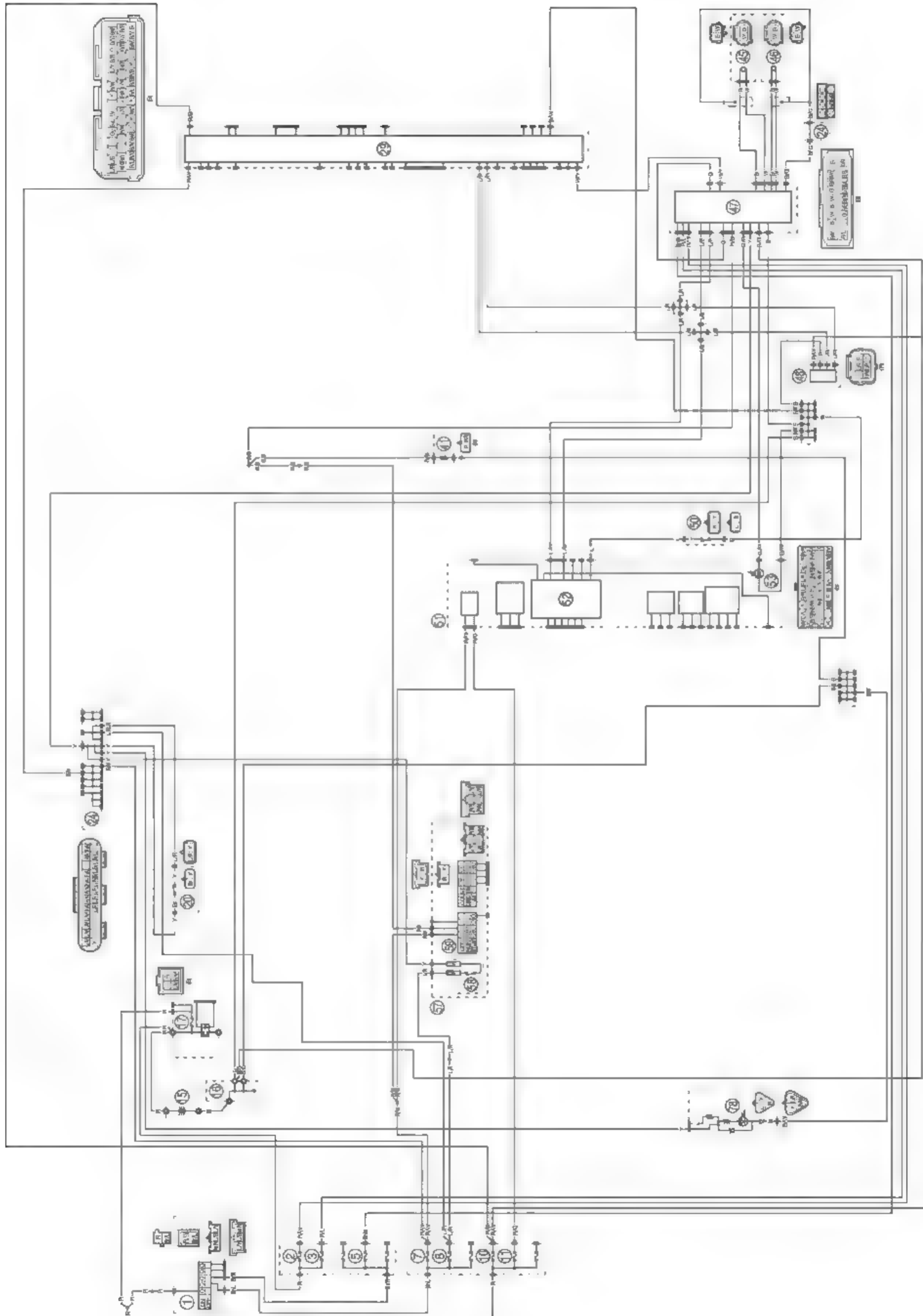
ABS (Anti-lock Brake System)

EAS20443

ABS (Anti-lock Brake System)

EAS32890

CIRCUIT DIAGRAM



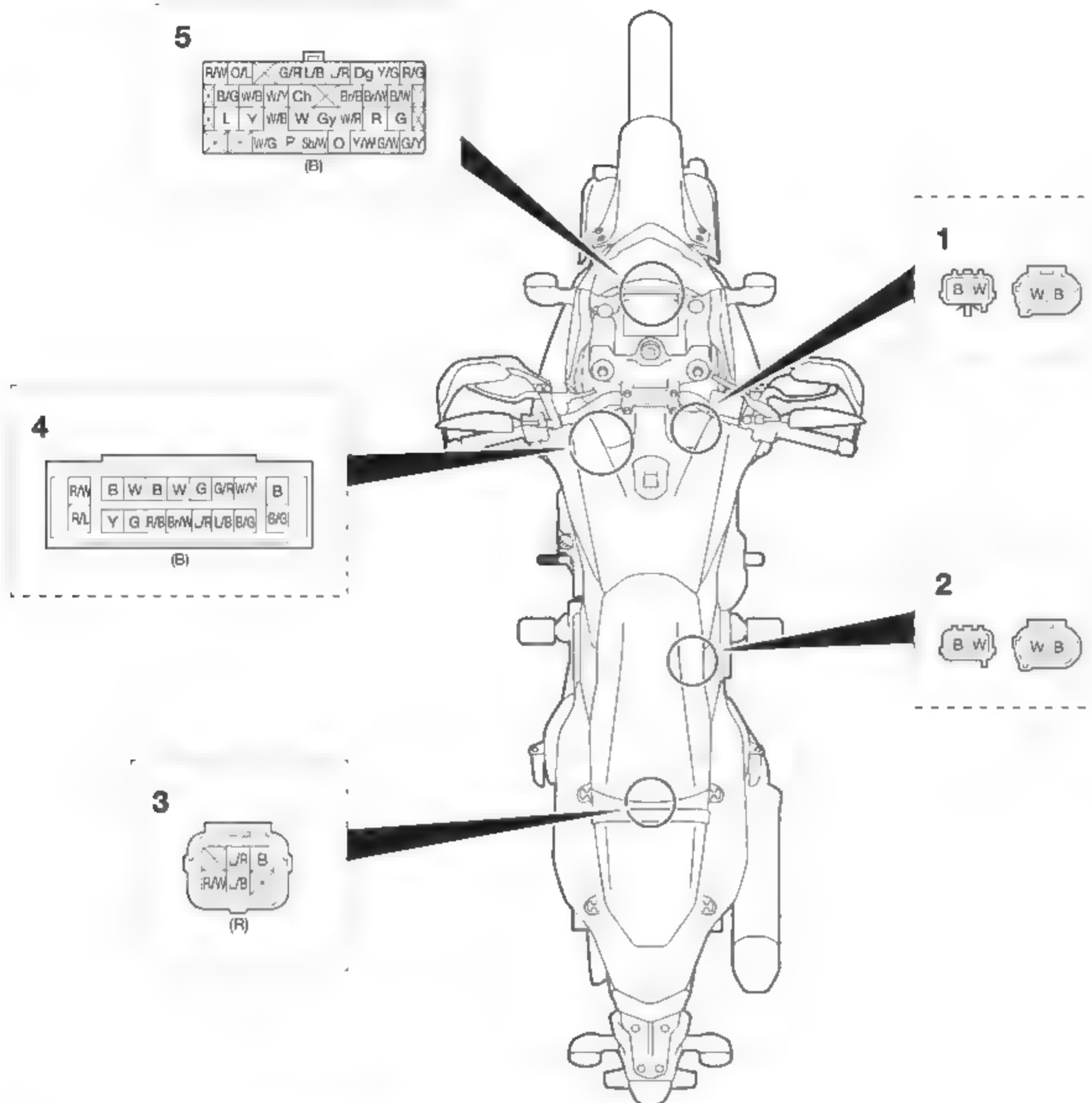
ABS (Anti-lock Brake System)

1. Main switch
2. ABS solenoid fuse
3. ABS motor fuse
5. ABS control unit fuse
7. Ignition fuse
8. Signaling system fuse
10. Fuel injection system fuse
11. Backup fuse
15. Battery
16. Engine ground
17. Main fuse
20. Rear brake light switch
24. Joint coupler
29. ECU (Engine Control Unit)
41. Resistor unit
45. Front wheel sensor
46. Rear wheel sensor
47. ABS ECU
48. YDT coupler
50. "ABS ON" button
51. Meter assembly
52. Multi-function meter
53. ABS warning light
57. Handlebar switch (right)
58. Front brake light switch
59. Stop/run/start switch
78. Tail/brake light

ABS (Anti-lock Brake System)

EAS32892

ABS COUPLER LOCATION CHART



1. Front wheel sensor coupler
2. Rear wheel sensor coupler
3. YDT coupler
4. ABS ECU coupler
5. Meter assembly coupler

EAS32893

MAINTENANCE OF THE ABS ECU

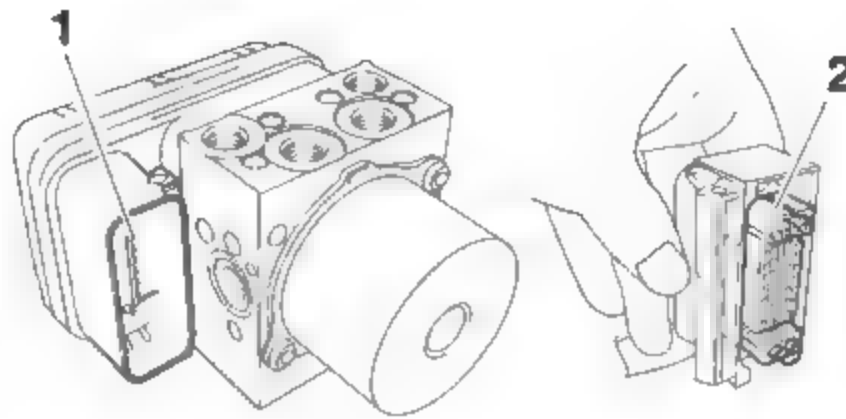
Checking the ABS ECU

1. Check:

- Terminals "1" of the hydraulic unit assembly (ABS ECU)
Cracks/damages → Replace the hydraulic unit assembly, brake hoses, and brake pipes that are connected to the assembly as a set.
- Terminals "2" of the ABS ECU coupler
Connection defective, contaminated, come-off → Correct or clean.

TIP

If the ABS ECU coupler is clogged with mud or dirt, clean with compressed air.



EAS33284

ABS TROUBLESHOOTING OUTLINE

EWA18710



When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer.

TIP

To final check, refer to "[C-1] FINAL CHECK" on page 9-21.

ABS operation when the ABS warning light comes on

1. The ABS warning light remains on → ABS operates as a normal brake system.
 - A malfunction was detected using the ABS self-diagnosis function.
 - The ABS self-diagnosis has not been completed.
The ABS self-diagnosis starts when the main switch is turned to "ON" and finishes when the vehicle has traveled at a speed of approximately 10 km/h (6 mi/h).
2. The ABS warning light comes on after the engine starts, and then goes off when the vehicle starts moving (traveling at a speed of approximately 10 km/h (6 mi/h)). → ABS operation is normal.
3. The ABS warning light flashes → ABS operation is normal.
 - Refer to "BASIC INSTRUCTIONS FOR TROUBLESHOOTING" on page 9-17.

Self-diagnosis with the ABS ECU

The ABS ECU performs a static check of the entire system when the main switch is turned to "ON". It also checks for malfunctions while the vehicle is ridden. Since all malfunctions are recorded after they are detected, it is possible to check the recorded malfunction data by utilizing the YDT when the ABS ECU has entered the self-diagnosis mode.

ABS (Anti-lock Brake System)

TIP

The ABS performs a self-diagnosis test for a few seconds each time the vehicle first starts off after the main switch was turned to "ON". During this test, a "clicking" noise can be heard from under the fuel tank, and if the brake lever or brake pedal are even slightly applied, a vibration can be felt at the lever and pedal, but these do not indicate a malfunction.

Special precautions for handling and servicing a vehicle equipped with ABS

ECA17620

NOTICE

Care should be taken not to damage components by subjecting them to shocks or pulling on them with too much force since the ABS components are precisely adjusted.

- The ABS ECU and hydraulic unit are united assemblies and cannot be disassembled.
- The malfunction history is stored in the memory of the ABS ECU. Delete the DTC when the service is finished. (This is because the past DTC will be displayed again if another malfunction occurs.)

EAS32895

BASIC INSTRUCTIONS FOR TROUBLESHOOTING

1. Check the DTC of "malfunction" using the YDT.
2. Check and repair the malfunction according to applicable DTC troubleshooting.
3. Turn the main switch from "OFF" to "ON", and then check the DTC of "malfunction" is not displayed.

TIP

- If another DTC is displayed, repeat steps (1) to (3) until no DTC is displayed.
 - Turning the main switch to "OFF" will not erase the malfunction history.
-

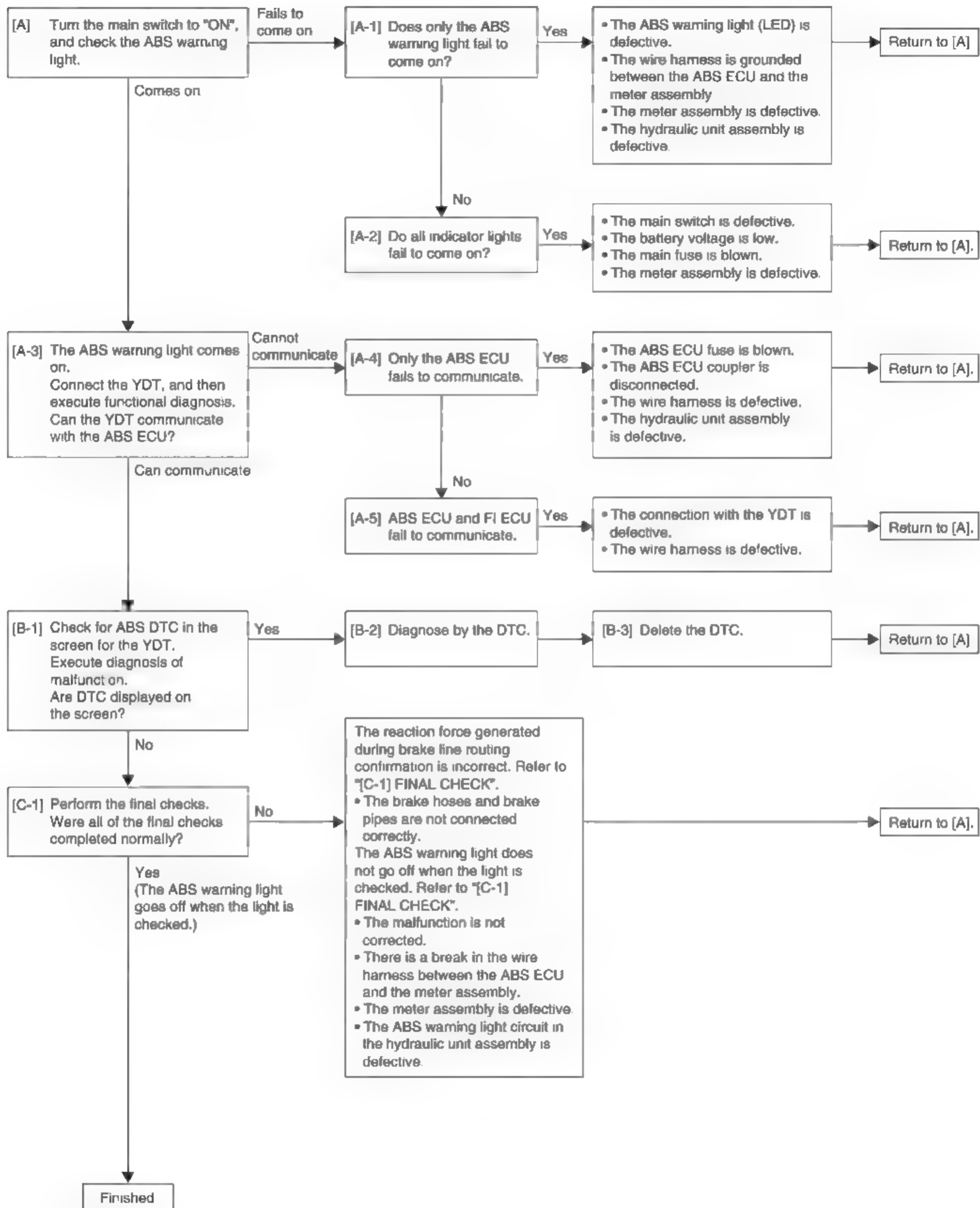
4. Do the final check.

EWA17420

WARNING

- Perform the troubleshooting [A]→[B]→[C] in order. Be sure to follow the order since a wrong diagnosis could result if the steps are followed in a different order or omitted.
 - Use sufficiently charged regular batteries only.
-

ABS (Anti-lock Brake System)



EAS32897

[A] CHECKING THE ABS WARNING LIGHT

Turn the main switch to "ON". (Do not start the engine.)

1. The ABS warning light does not come on.
 - Only the ABS warning light fails to come on. [A-1]
 - The ABS warning light and all other indicator lights fail to come on. [A-2]
2. The ABS warning light comes on. [A-3]

EAS32898

[A-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON

1. Check for a short circuit to the ground between the green/orange terminal of the ABS ECU coupler and green/orange terminal of the meter assembly.
 - If there is short circuit to the ground, the wire harness is defective. Replace the wire harness.
2. Disconnect the ABS ECU coupler and check that the ABS warning light comes on when the main switch is turned to "ON".
 - If the ABS warning light does not come on, the meter assembly circuit (including the ABS warning light [LED]) is defective. Replace the meter assembly.
 - If the ABS warning light comes on, the ABS ECU is defective. Replace the hydraulic unit assembly.

EAS32899

[A-2] ALL INDICATOR LIGHTS FAIL TO COME ON

1. Main switch
 - Check the main switch for continuity.
Refer to "CHECKING THE SWITCHES" on page 8-37.
 - If there is no continuity, replace the main switch.
2. Battery
 - Check the condition of the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.
 - If the battery is defective, clean the battery terminals and recharge it, or replace the battery.
3. Main fuse
 - Check the fuse for continuity.
Refer to "CHECKING THE FUSES" on page 8-38.
 - If the main fuse is blown, replace the fuse.
4. Circuit
 - Check the meter assembly circuit.
Refer to "CIRCUIT DIAGRAM" on page 9-13.
 - If the meter assembly circuit is open, replace the wire harness.

EAS32900

[A-3] THE ABS WARNING LIGHT COMES ON

Connect the YDT to the YDT coupler and execute functional diagnosis. (For information about how to execute functional diagnosis, refer to the operation manual that is included with the tool.)

Check that communication with the ABS ECU is possible.

- Only the ABS ECU fails to communicate. [A-4]
- ABS ECU and FI ECU fail to communicate. [A-5]
- Communication is possible with the ABS ECU. [B-1] (The ABS is displayed on the select unit screen.)

EAS32901

[A-4] ONLY THE ABS ECU FAILS TO COMMUNICATE

1. ABS control unit fuse
 - Check the ABS control unit fuse for continuity.
Refer to "CHECKING THE FUSES" on page 8-38.
 - If the ABS control unit fuse is blown, replace the fuse.

ABS (Anti-lock Brake System)

2. ABS ECU coupler

- Check that the ABS ECU coupler is connected properly.

For information about connecting the ABS ECU coupler properly, refer to "INSTALLING THE HYDRAULIC UNIT ASSEMBLY" on page 4-51.

3. Wire harness

- Open circuit between the main switch and the ABS ECU, or between the ABS ECU and the ground. Check for continuity between brown/blue terminal of the main switch coupler and brown/white terminal of the ABS ECU coupler.

Check for continuity between black terminal of the ABS ECU coupler and the ground.

If there is no continuity, the wire harness is defective. Replace the wire harness.

- Open circuit in the wire harness between the ABS ECU coupler and the YDT coupler. Check for continuity between blue/red terminal of the ABS ECU coupler and blue/red terminal of the YDT coupler. (CANH)

Check for continuity between blue/black terminal of the ABS ECU coupler and blue/black terminal of the YDT coupler. (CANL)

4. ABS ECU malfunction

Replace the hydraulic unit assembly.

EAS32902

[A-5] ABS ECU AND FI ECU FAIL TO COMMUNICATE

1. YDT

Check that the YDT is properly connected.

2. Wire harness

- Open circuit in the wire harness between the ABS ECU coupler and the YDT coupler. Check for continuity between blue/red terminal of the ABS ECU coupler and blue/red terminal of the YDT coupler. (CANH)

Check for continuity between blue/black terminal of the ABS ECU coupler and blue/black terminal of the YDT coupler. (CANL)

EAS32903

[B-1] MALFUNCTION ARE CURRENTLY DETECTED

When the YDT is connected to the YDT coupler, the DTC will be displayed on the computer screen.

- A DTC is displayed. [B-2]
- A DTC is not displayed. [C-1]

EAS32904

[B-2] DIAGNOSIS USING THE DTC

This model uses the YDT to identify malfunctions.

For information about using the YDT, refer to the operation manual that is included with the tool.

	Yamaha diagnostic tool USB (US) 90890-03269
	Yamaha diagnostic tool (A/I) 90890-03273

TIP

- Yamaha diagnostic tool (A/I) (90890-03273) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Details about the displayed DTCs are shown in the following chart. Refer to this chart and check the vehicle.

Once all the work is complete, delete the DTCs. [B-3]

TIP

Do the final check after terminating the connection with the YDT and turning the main switch off. [C-1]

EAS33339

[B-3] DELETING THE DTC

To delete the DTCs, use the YDT. For information about deleting the DTCs, refer to the operation manual of the YDT.

Check that all the displayed DTCs are deleted.



Yamaha diagnostic tool USB (US)

90890-03269

Yamaha diagnostic tool (A/I)

90890-03273

TIP

- Yamaha diagnostic tool (A/I) (90890-03273) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

EAS32905

[C-1] FINAL CHECK

EWA16710



WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer.

Check all the following items to complete the inspection.

If the process is not completed properly, start again from the beginning.

Checking procedures

1. Check the brake fluid level in the front brake master cylinder reservoir and the rear brake master cylinder reservoir.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-16.
2. Check the wheel sensors for proper installation.
Refer to "INSTALLING THE FRONT WHEEL" on page 4-15 and "INSTALLING THE REAR WHEEL" on page 4-23.
3. Perform brake line routing confirmation.
Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-53.
If it does not have reaction-force properly, the brake hose is not properly routed or connected.
4. Delete the DTCs.
Refer to "[B-3] DELETING THE DTC" on page 9-21.
5. Checking the ABS warning light.
Confirm the ABS warning light go off.
If the ABS warning light does not come on or does not go off, refer to "[A] CHECKING THE ABS WARNING LIGHT" on page 9-19.
If the ABS warning light does not turn off, the possible causes are following:
 - The problem is not solved.
 - Open circuit between the ABS ECU and the meter assembly.
Check for continuity between green/red terminal of the ABS ECU coupler and green/red terminal of the meter assembly coupler.
 - Malfunction in the meter assembly circuit.
 - Malfunction in the ABS warning light circuit in the hydraulic unit assembly.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS20551

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS33149

DTC TABLE

DTC	Symptom	Fail-safe system		Diagnostic code
		Starting the engine	Driving the vehicle	
"11, 25_ABS"	Front wheel sensor (intermittent pulses or no pulses)	—	—	—
"12_ABS"	Rear wheel sensor (intermittent pulses or no pulses)	—	—	—
"13, 26_ABS"	Front wheel sensor (abnormal pulse period)	—	—	—
"14, 27_ABS"	Rear wheel sensor (abnormal pulse period)	—	—	—
"15_ABS"	Front wheel sensor (open or short circuit)	—	—	—
"16_ABS"	Rear wheel sensor (open or short circuit)	—	—	—
"17, 45_ABS"	Front wheel sensor (missing pulses)	—	—	—
"18, 46_ABS"	Rear wheel sensor (missing pulses)	—	—	—
"21_ABS"	Hydraulic unit assembly (defective solenoid drive circuit)	—	—	—
"24_ABS"	Brake light switch or tail/brake light	—	—	—
"30_EVENT"	Latch up detected.	Unable	Unable	08
"31_ABS"	Hydraulic unit assembly (defective ABS solenoid power circuit)	—	—	—
"32_ABS"	Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)	—	—	—
"33_ABS"	Hydraulic unit assembly (abnormal ABS motor power supply)	—	—	—
"34_ABS"	Hydraulic unit assembly (short circuit in ABS motor power supply circuit)	—	—	—
"41_ABS"	Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	—	—	—
"42, 47_ABS"	Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	—	—	—
"43_ABS"	Front wheel sensor (missing pulses)	—	—	—
"44_ABS"	Rear wheel sensor (missing pulses)	—	—	—
"51, 52_ABS"	[51_ABS] Vehicle system power supply (voltage of ABS ECU power supply is high) [52_ABS] Vehicle system power supply (voltage of wheel sensor power supply is high)	—	—	—
"53_ABS"	Vehicle system power supply (voltage of ABS ECU power supply is low)	—	—	—
"54_ABS"	Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)	—	—	—
"56_ABS"	Hydraulic unit assembly (abnormal internal power supply)	—	—	—

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Symptom	Fail-safe system		Diagnostic code
		Starting the engine	Driving the vehicle	
"63_ABS"	Front wheel sensor power supply (voltage of power supply is low)	—	—	—
"64_ABS"	Rear wheel sensor power supply (voltage of power supply is low)	—	—	—
"70_EVENT"	Engine forcibly stops when the vehicle is left idling for a long period.	Unable	Unable	—
"89_ABS"	CAN communication (between meter assembly and hydraulic unit assembly)	—	—	—
"90_ABS"	CAN communication (between ECU and hydraulic unit assembly)	—	—	—
"P0030"	O ₂ sensor heater: defective heater controller detected.	Able	Able	—
"P00D1, P2195"	[P00D1] O ₂ sensor: heater performance deterioration. [P2195] O ₂ sensor: open circuit detected.	Able	Able	—
"P0107, P0108"	[P0107] Intake air pressure sensor: ground short circuit detected. [P0108] Intake air pressure sensor: open or power short circuit detected.	Able	Able	04
"P0112, P0113"	[P0112] Intake air temperature sensor: ground short circuit detected. [P0113] Intake air temperature sensor: open or power short circuit detected.	Able	Able	05
"P0117, P0118"	[P0117] Coolant temperature sensor: ground short circuit detected. [P0118] Coolant temperature sensor: open or power short circuit detected.	Able	Able	06
"P0122, P0123"	[P0122] Throttle position sensor: open or ground short circuit detected. [P0123] Throttle position sensor: power short circuit detected.	Able/Unable	Able/Unable	01
"P0132"	O ₂ sensor: short circuit detected (power short circuit).	Able	Able	—
"P0201"	Fuel injector #1: malfunction in fuel injector #1.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)	36
"P0202"	Fuel injector #2: malfunction in fuel injector #2.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)	37
"P0335"	Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	Unable	Unable	—

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Symptom	Fail-safe system		Diagnostic code
		Starting the engine	Driving the vehicle	
"P0351"	Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.	Unable	Unable	30
"P0352"	Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.	Unable	Unable	31
"P0458"	Purge cut valve solenoid: open circuit detected.	Able	Able	46
"P0480"	Radiator fan motor relay: open or short circuit detected.	Able	Able	51
"P0507"	Engine idling speed is too high.	Able	Able	54
"P0511"	ISC (Idle Speed Control) valve: ISC valve does not operate.	Able	Able	54
"P0560, P0563"	[P0560] Charging voltage is abnormal. [P0563] Vehicle system power voltage out of range.	Able	Able	—
"P0601"	Internal malfunction in ECU. (When this malfunction is detected in the ECU, the DTC might not appear on the tool display.)	Unable	Unable	—
"P062F"	EEPROM DTC: an error is detected while reading or writing on EEPROM.	Able/Unable	Able/Unable	60
"P0657"	Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	Able	Able	09, 50
"P1500"	Rear wheel sensor: no normal signals are received from the rear wheel sensor. Neutral switch: open or short circuit is detected. Clutch switch: open or short circuit is detected.	Able	Able	07, 21
"P1601"	Sidestand switch: open or short circuit of the black/red lead of the ECU is detected.	Unable	Unable	20
"P1602"	Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).	Able/Unable	Able/Unable	—
"P1604, P1605"	[P1604] Lean angle sensor: ground short circuit detected. [P1605] Lean angle sensor: open or short circuit detected.	Unable	Unable	08
"U0155 or Err"	Multi-function meter: signals cannot be transmitted between the ECU and the multifunction meter.	Able	Able	—

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS33026

SELF-DIAGNOSTIC FUNCTION TABLE (FOR FUEL INJECTION SYSTEM)

TIP

For details of the DTC, refer to "BASIC PROCESS FOR TROUBLESHOOTING" on page 9-11.

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
30_EVENT	Latch up detected.	<ul style="list-style-type: none"> • The vehicle has overturned. • Installed condition of lean angle sensor. • Defective lean angle sensor. • Malfunction in ECU. 	—	—
70_EVENT	Engine forcibly stops when the vehicle is left idling for a long period.	<ul style="list-style-type: none"> • Allow to idle for a long period of time. • Malfunction in ECU. 	—	—
P0030	O ₂ sensor heater: defective heater controller detected.	<ul style="list-style-type: none"> • Open or short circuit in wire harness. • Disconnected coupler. • Defective O₂ sensor heater controller (Malfunction in ECU). • Broken or disconnected lead in O₂ sensor heater. 	(When the O ₂ sensor does not operate because the exhaust temperature is low) Increased exhaust emissions. Fuel learning cannot be carried out.	Display only (If the O ₂ sensor does not operate, O ₂ feedback is not carried out.)
P00D1	O ₂ sensor: heater performance deterioration	<ul style="list-style-type: none"> • Improperly installed O₂ sensor. • Defective coupler between O₂ sensor and ECU. • Open or short circuit in wire harness between O₂ sensor and ECU. • Incorrect fuel pressure. • Defective O₂ sensor. • Malfunction in ECU. 	Increased exhaust emissions.	O ₂ feedback is not carried out. O ₂ learning is not carried out.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0107 P0108	[P0107] Intake air pressure sensor: ground short circuit detected. [P0108] Intake air pressure sensor: open or power short circuit detected.	[P0107] Low voltage of the intake air pressure sensor circuit (0.5 V or less) [P0108] High voltage of the intake air pressure sensor circuit (4.8 V or more) • Defective coupler between intake air pressure sensor and ECU. • Open or short circuit in wire harness between intake air pressure sensor and ECU. • Defective intake air pressure sensor. • Malfunction in ECU.	Engine idling speed is unstable. Engine response is poor. Loss of engine power. Increased exhaust emissions.	α -N is fixed. Fuel is not cut off due to the intake air pressure difference. Intake air pressure is fixed to 101.3 [kPa]. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.
P0112 P0113	[P0112] Intake air temperature sensor: ground short circuit detected. [P0113] Intake air temperature sensor: open or power short circuit detected.	[P0112] Low voltage of the intake air temperature sensor circuit (0.1 V or less) [P0113] High voltage of the intake air temperature sensor circuit (4.8 V or more) • Defective coupler between intake air temperature sensor and ECU. • Open or short circuit in wire harness between intake air temperature sensor and ECU. • Improperly installed intake air temperature sensor. • Defective intake air temperature sensor. • Malfunction in ECU.	Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable.	The intake air temperature is fixed to 20 [°C]. O ₂ sensor heater driving is not carried out. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0117 P0118	[P0117] Coolant temperature sensor: ground short circuit detected. [P0118] Coolant temperature sensor: open or power short circuit detected.	[P0117] Low voltage of the coolant temperature sensor circuit (0.1 V or less) [P0118] High voltage of the coolant temperature sensor circuit (4.9 V or more) • Defective coupler between coolant temperature sensor and ECU. • Open or short circuit in wire harness between coolant temperature sensor and ECU. • Improperly installed coolant temperature sensor. • Defective coolant temperature sensor. • Malfunction in ECU.	Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable.	The radiator fan motor relay is on only when the vehicle is traveling at low speeds. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. The coolant temperature is fixed to 60 [°C].
P0122 P0123	[P0122] Throttle position sensor: open or ground short circuit detected. [P0123] Throttle position sensor: power short circuit detected.	[P0122] Low voltage of the throttle position sensor circuit (0.2 V or less) [P0123] High voltage of the throttle position sensor circuit (4.8 V or more) • Defective coupler between throttle position sensor and ECU. • Open or short circuit in wire harness between throttle position sensor and ECU. • Improperly installed throttle position sensor. • Defective throttle position sensor. • Malfunction in ECU.	Engine idling speed is high. Engine idling speed is unstable. Engine response is poor. Loss of engine power. Deceleration is poor. Increased exhaust emissions. Vehicle cannot be driven.	Change in the throttle opening is 0 (transient control is not carried out). D-j is fixed. Throttle opening is fixed to 125 [°]. Atmospheric pressure is fixed to 101.3 [kPa]. O ₂ feedback is not carried out. Fuel is not cut off due to the throttle opening. Output is restricted. ISC feedback is not carried out. ISC learning is not carried out.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0132	O ₂ sensor: short circuit detected (power short circuit).	<p>High voltage of the O₂ sensor circuit (4.8 V or more)</p> <ul style="list-style-type: none"> • Improperly installed O₂ sensor. • Defective coupler between O₂ sensor and ECU. • Open or short circuit in wire harness between O₂ sensor and ECU. • Incorrect fuel pressure. • Defective O₂ sensor. • Malfunction in ECU. 	Increased exhaust emissions.	O ₂ feedback is not carried out. O ₂ feedback learning is not carried out.
P0201 P0202	<p>[P0201] Fuel injector #1: malfunction in fuel injector #1.</p> <p>[P0202] Fuel injector #2: malfunction in fuel injector #2.</p>	<ul style="list-style-type: none"> • Defective coupler between fuel injector and ECU. • Open or short circuit in wire harness between fuel injector and ECU. • Defective fuel injector. • Malfunction in ECU. • Improperly installed fuel injector. 	<p>Loss of engine power.</p> <p>Engine is difficult to start.</p> <p>Engine cannot be started.</p> <p>Engine stops.</p> <p>Engine idling speed is unstable.</p> <p>Increased exhaust emissions.</p>	O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.
P0335	Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	<ul style="list-style-type: none"> • Defective coupler between crankshaft position sensor and ECU. • Open or short circuit in wire harness between crankshaft position sensor and ECU. • Improperly installed crankshaft position sensor. • Malfunction in generator rotor. • Defective crankshaft position sensor. • Malfunction in ECU. 	Engine cannot be started.	Does not operate. ISC feedback is not carried out. ISC learning is not carried out.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0351 P0352	[P0351] Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil. [P0352] Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.	<ul style="list-style-type: none"> • Defective coupler between ignition coil and ECU. • Open or short circuit in wire harness between ignition coil and ECU. • Improperly installed ignition coil. • Defective ignition coil. • Malfunction in ECU. 	Engine stops. Loss of engine power. Engine is difficult to start. Engine cannot be started. Engine idling speed is unstable. Increased exhaust emissions.	Injection to the applicable cylinder group is cut off. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.
P0458	Purge cut valve solenoid: open circuit detected.	<ul style="list-style-type: none"> • Open or short circuit in wire harness. • Defective purge cut valve solenoid. • Malfunction in ECU. 	Vapor gas cannot be purged from canister.	Closing side on purge cut valve solenoid is fixed.
P0480	Radiator fan motor relay: open or short circuit detected.	<ul style="list-style-type: none"> • Open or short circuit in wire harness. • Disconnected coupler. • Defective radiator fan motor relay. • Defective radiator fan motor relay controller (Malfunction in ECU). 	Engine is difficult to start. Loss of engine power. Engine overheats. Increased exhaust emissions.	Radiator fan motor relay is off all the time. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.
P0507	<ul style="list-style-type: none"> • Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard). • Defective ISC (idle speed control) unit (ISC operating sound is not heard). 	<ul style="list-style-type: none"> • Defective speed sensor. • Defective coupler between ISC unit and ECU. • Open or short circuit in wire harness between ISC unit and ECU. • Improperly installed ISC unit. • Disconnected ISC unit hose or air leak from intake air passage. • Defective throttle valve or throttle cable. • Defective ISC unit (ISC valve stuck fully open). • Malfunction in ECU. 	Engine idling speed is high.	ISC learning is not carried out.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0511	ISC unit (malfunction in ISC unit)	<ul style="list-style-type: none"> Defective coupler between ISC unit and ECU. Open or short circuit in wire harness between ISC unit and ECU. Defective ISC stepping motor. Malfunction in ECU. 	Engine is difficult to start. Engine idling speed is unstable. Engine idling speed is high.	Power is not supplied to the ISC unit. ISC learning is not carried out.
P0560	Charging voltage is abnormal.	<ul style="list-style-type: none"> Battery over-discharging (broken or disconnected lead in charging system). Battery over-discharging (defective rectifier/regulator). 	Engine is difficult to start. Increased exhaust emissions. Battery performance has deteriorated or battery is defective.	O ₂ feedback is not carried out.
P0563	Vehicle system power voltage out of range	<ul style="list-style-type: none"> Battery overcharging (defective rectifier/regulator). Battery overcharging (broken or disconnected lead in rectifier/regulator wire harness). 	Engine is difficult to start. Increased exhaust emissions. Battery performance has deteriorated or battery is defective.	O ₂ feedback is not carried out.
P0601	Internal malfunction in ECU. (When this malfunction is detected in the ECU, the DTC might not appear on the tool display.)	<ul style="list-style-type: none"> Malfunction in ECU. 	Engine cannot be started.	Engine cannot be started.
P062F	EEPROM DTC: an error is detected while reading or writing on EEPROM.	<ul style="list-style-type: none"> CO adjustment value is not properly written. ISC learning value is not properly written. O₂ feedback learning value is not properly written. OBD memory value is not properly written. Malfunction in ECU. 	Increased exhaust emissions. Engine cannot be started or is difficult to start. Engine idling speed is unstable. OBD memory value is not correct.	CO adjustment value for the faulty cylinder = 0 (default value) ISC learning values = Default values. OBD memory value is initialized. Initialization of O ₂ feedback learning value.
P0657	Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	<ul style="list-style-type: none"> Open or short circuit in wire harness between relay unit and ECU. Open circuit in wire harness between battery and ECU. Defective relay unit. Malfunction in ECU. 	Engine is difficult to start. Increased exhaust emissions.	Monitor voltage = 12 [V] O ₂ feedback is not carried out.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P1500	<ul style="list-style-type: none"> • Rear wheel sensor (no normal signals are received from the rear wheel sensor) • Gear position switch (open or short circuit is detected) • Clutch switch (open or short circuit is detected) 	<ul style="list-style-type: none"> • Open or short circuit in wire harness between rear wheel sensor and ECU. • Open or short circuit in wire harness between ABS unit and ECU. • Open or short circuit in wire harness between gear position switch and ECU. • Open or short circuit in wire harness between clutch switch and ECU. • Defective rear wheel sensor. • Defective gear position switch. • Defective clutch switch. • Improper adjustment of clutch lever. • Malfunction in ECU. 	Indication of the neutral indicator light is incorrect. Engine idling speed is unstable.	O ₂ feedback is not carried out. Fuel cut-off control when the rear wheel sensor or gear position switch malfunctions is carried out. ISC feedback is not carried out. ISC learning is not carried out.
P1601	Sidestand switch: open or short circuit of the black/red lead of the ECU is detected.	<ul style="list-style-type: none"> • Defective coupler between relay unit and ECU. • Open or short circuit in wire harness between relay unit and ECU. • Defective coupler between sidestand switch and relay unit. • Open or short circuit in wire harness between sidestand switch and relay unit. • Defective sidestand switch. • Malfunction in ECU. 	Engine cannot be started.	Engine is forcefully stopped (the injector output is stopped).
P1602	Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).	<ul style="list-style-type: none"> • Open or short circuit in wire harness between ECU and battery. • Open or short circuit in wire harness between ECU and main switch. • Blown fuel injection system fuse. • Malfunction in ECU. 	Engine idling speed is unstable. Engine idling speed is high. Increased exhaust emissions. Engine is difficult to start.	O ₂ feedback learning is not carried out. O ₂ feedback learning value is not written.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P1604 P1605	[P1604] Lean angle sensor (ground short circuit detected) [P1605] Lean angle sensor (open or power short circuit detected)	[P1604] Low voltage of the lean angle sensor circuit (0.2 V or less) [P1605] High voltage of the lean angle sensor circuit (4.8 V or more) • Open or short circuit in wire harness between lean angle sensor and ECU. • Defective lean angle sensor. • Malfunction in ECU.	Engine cannot be started.	Engine cannot be started.
P2195	O ₂ sensor: open circuit detected.	• Signal voltage is 0.18–0.49 V. • Improperly installed O ₂ sensor. • Defective coupler between O ₂ sensor and ECU. • Open or short circuit in wire harness between O ₂ sensor and ECU. • Incorrect fuel pressure. • Defective O ₂ sensor. • Malfunction in ECU.	Increased exhaust emissions.	O ₂ feedback is not carried out. O ₂ feedback learning is not carried out.
U0155	CAN communication error (with the meter).	• Defective coupler between meter assembly and ECU. • Open or short circuit in wire harness between meter assembly and ECU. • Defective meter assembly. • Malfunction in ECU.	Defective meter display.	Grip warmer (OPTION) output: OFF is fixed. MAP changeover: State is fixed. Meter switch input: OFF is fixed.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS33286

SELF-DIAGNOSTIC FUNCTION TABLE (FOR ABS (Anti-lock Brake System))

TIP

For details of the DTC, refer to "BASIC INSTRUCTIONS FOR TROUBLESHOOTING" on page 9-17.

DTC	Item	Symptom	Check point
11* 25*	Front wheel sensor (intermittent pulses or no pulses)	Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
12	Rear wheel sensor (intermittent pulses or no pulses)	Rear wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor
13* 26*	Front wheel sensor (abnormal pulse period)	Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
14* 27*	Rear wheel sensor (abnormal pulse period)	Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Symptom	Check point
15	Front wheel sensor (open or short circuit)	Open or short circuit is detected in the front wheel sensor.	<ul style="list-style-type: none"> • Defective coupler between the front wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly • Defective front wheel sensor or hydraulic unit assembly
16	Rear wheel sensor (open or short circuit)	Open or short circuit is detected in the rear wheel sensor.	<ul style="list-style-type: none"> • Defective coupler between the rear wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly • Defective rear wheel sensor or hydraulic unit assembly
17* 45*	Front wheel sensor (missing pulses)	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
18* 46*	Rear wheel sensor (missing pulses)	Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor
21	Hydraulic unit assembly (defective solenoid drive circuit)	Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.	<ul style="list-style-type: none"> • Defective hydraulic unit assembly

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Symptom	Check point
24	Brake light switch or tail/brake light	Brake light signal is not received properly while the vehicle is traveling. (Brake light circuit, or front or rear brake light switch circuit)	<ul style="list-style-type: none"> • Defective signaling system (tail/brake light or brake light switch) • Defective coupler between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly • Open or short circuit in the wire harness between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly • Defective hydraulic unit assembly
31	Hydraulic unit assembly (defective ABS solenoid power circuit)	Power is not supplied to the solenoid circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Blown ABS solenoid fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly
32	Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)	Short circuit is detected in the solenoid power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Defective hydraulic unit assembly
33	Hydraulic unit assembly (abnormal ABS motor power supply)	Power is not supplied to the motor circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Blown ABS motor fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly
34	Hydraulic unit assembly (short circuit in ABS motor power supply circuit)	Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Defective hydraulic unit assembly
41	Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	<ul style="list-style-type: none"> • Pulses from the front wheel sensor are received intermittently while the vehicle is traveling. • Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure. 	<ul style="list-style-type: none"> • Incorrect installation of the front wheel sensor • Incorrect rotation of the front wheel • Front brake dragging • Defective hydraulic unit assembly

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Symptom	Check point
42 47	Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	<ul style="list-style-type: none"> • Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. (for DTC No. 42) • Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure. 	<ul style="list-style-type: none"> • Incorrect installation of the rear wheel sensor (for DTC No. 42) • Incorrect rotation of the rear wheel • Rear brake dragging • Defective hydraulic unit assembly
43	Front wheel sensor (missing pulses)	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
44	Rear wheel sensor (missing pulses)	Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	<ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor
51 52	<ul style="list-style-type: none"> • Vehicle system power supply (voltage of ABS ECU power supply is high) (for DTC No. 51) • Vehicle system power supply (voltage of wheel sensor power supply is high) (for DTC No. 52) 	<ul style="list-style-type: none"> • Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high. (for DTC No. 51) • Power voltage supplied to the wheel sensor is too high. (for DTC No. 52) 	<ul style="list-style-type: none"> • Defective battery • Disconnected battery terminal • Defective charging system
53	Vehicle system power supply (voltage of ABS ECU power supply is low)	Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too low.	<ul style="list-style-type: none"> • Defective battery • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective charging system

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

DTC	Item	Symptom	Check point
54	Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)	Abnormality is detected in the solenoid or motor power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Defective battery • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective charging system • Defective hydraulic unit assembly
56	Hydraulic unit assembly (abnormal internal power supply)	Abnormality is detected in the power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> • Defective hydraulic unit assembly
63	Front wheel sensor power supply (voltage of power supply is low)	Power voltage supplied from the ABS ECU to the front wheel sensor is too low.	<ul style="list-style-type: none"> • Short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly • Defective front wheel sensor • Defective hydraulic unit assembly
64	Rear wheel sensor power supply (voltage of power supply is low)	Power voltage supplied from the ABS ECU to the rear wheel sensor is too low.	<ul style="list-style-type: none"> • Short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly • Defective rear wheel sensor • Defective hydraulic unit assembly
89	CAN communication (between meter assembly and ABS ECU)	Transmitted data from the meter cannot be normally received.	<ul style="list-style-type: none"> • Defective coupler between meter assembly and ABS ECU • Open or short-circuit in the wire harness between meter assembly and ABS ECU • Defective meter assembly • Defective ABS ECU
90	CAN communication (between ECU and ABS ECU)	Transmitted data from the ECU cannot be normally received.	<ul style="list-style-type: none"> • Defective coupler between ECU and ABS ECU • Open or short-circuit in the wire harness between ECU and ABS ECU • Defective ECU • Defective ABS ECU

* The DTC number varies according to the vehicle conditions.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE


EAS33030

COMMUNICATION ERROR WITH THE METER

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
U0155 (YDT) Err (multi-function meter display)	CAN communication error (with the meter)	Communication between the ECU and the meter is not possible <ul style="list-style-type: none"> Defective meter coupler and ECU coupler Open or short circuit in the wire harness between the meter and the ECU Defective meter Defective ECU 	Defective meter display.	MAP changeover: State is fixed. Meter switch input: OFF is fixed. Grip warmer (OPTION): OFF is fixed.

EAS33031

DIAGNOSTIC CODE: SENSOR OPERATION TABLE

Diagnostic code No.	Item	Tool display	Procedure
01	Throttle position sensor signal <ul style="list-style-type: none"> Fully closed position Fully open position 	11–21 96–106	Check with throttle valves fully closed. Check with throttle valves fully open.
04	Intake air pressure	Displays the intake air pressure.	Operate the throttle while pushing the “  ” side of the stop/run/start switch. (If the display value changes, the performance is OK.)
05	Intake air temperature	Displays the intake air temperature.	Compare the actually measured air temperature with the tool display value.
06	Coolant temperature	When engine is cold: Displays temperature closer to air temperature. When engine is hot: Displays current coolant temperature.	Compare the actually measured coolant temperature with the tool display value.
07	Rear wheel vehicle speed pulses	Rear wheel speed pulse 0–999	Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
08	Lean angle sensor <ul style="list-style-type: none"> Upright Overturned 	Lean angle sensor output voltage 0.4–1.4 3.7–4.4	Remove the lean angle sensor and incline it more than 65 degrees.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Tool display	Procedure
09	Fuel system voltage (battery voltage)	Fuel system voltage Approximately 12.0	Set the stop/run/start switch to "○", and then compare the actually measured battery voltage with the tool display value. (If the actually measured battery voltage is low, recharge the battery.)
20	Sidestand switch <ul style="list-style-type: none"> • Sidestand retracted • Sidestand extended 	ON OFF	Extend and retract the sidestand (with the transmission in gear).
21	Gear position switch and clutch switch <ul style="list-style-type: none"> • Transmission is in neutral • Transmission is in gear or the clutch lever released • Clutch lever is squeezed with the transmission in gear and when the sidestand is retracted • Clutch lever is squeezed with the transmission in gear and when the sidestand is extended 	ON OFF ON OFF	Operate the transmission, clutch lever, and sidestand.
60	EEPROM DTC display <ul style="list-style-type: none"> • No history • History exists 	00 <ul style="list-style-type: none"> • No malfunctions detected (If the DTC P062F is indicated, the ECU is defective.) 01-02 (CO adjustment value) <ul style="list-style-type: none"> • (If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.) Except 00-02 (EEPROM data error for corresponding learning/memory values)	—
67	ISC (Idle Speed Control) learning condition display ISC (Idle Speed Control) learning data erasure	00 ISC (Idle Speed Control) learning data has been erased. 01 It is not necessary to erase the ISC (Idle Speed Control) learning data. 02 It is necessary to erase the ISC (Idle Speed Control) learning data.	To erase the ISC (Idle Speed Control) learning data, push the "Operation" button 3 times in 5 seconds.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Tool display	Procedure
70	Control number	0-254 [-]	—
86	Shift sensor <ul style="list-style-type: none"> • When operating the shift pedal to shift up: • When the shift pedal is not operated: 	ON OFF	Check the ON/OFF condition of sensor when shift sensor (OPTION) is installed.
87	O ₂ feedback learning data erasure	00 O ₂ feedback learning data has been erased. 01 O ₂ feedback learning data has not been erased.	To erase the O ₂ feedback learning data, push the "Operation" button 3 times in 5 seconds.

EAS33032

DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE

Diagnostic code No.	Item	Actuation	Procedure
30	Cylinder-#1 ignition coil	Actuates the cylinder-#1 ignition coil five times at one-second intervals. The "check" indicator on the YDT screen come on each time the ignition coil is actuated.	Check that a spark is generated five times. • Connect an ignition checker.
31	Cylinder-#2 ignition coil	Actuates the cylinder-#2 ignition coil five times at one-second intervals. The "check" indicator on the YDT screen come on each time the ignition coil is actuated.	Check that a spark is generated five times. • Connect an ignition checker.
36	Fuel injector #1	Actuates the fuel injector #1 five times at one-second intervals. The "check" indicator on the YDT screen come on each time the fuel injector is actuated.	Disconnect the fuel pump coupler before doing this procedure. Check that fuel injector #1 is actuated five times by listening for the operating sound.
37	Fuel injector #2	Actuates the fuel injector #2 five times at one-second intervals. The "check" indicator on the YDT screen come on each time the fuel injector is actuated.	Disconnect the fuel pump coupler before doing this procedure. Check that fuel injector #2 is actuated five times by listening for the operating sound.
46	Purge cut valve solenoid	Actuates the purge cut valve solenoid five times at one-second intervals. The "check" indicator on the YDT screen come on each time the purge cut valve solenoid is actuated.	Check that the purge cut valve solenoid is actuated five times by listening for the operating sound.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Actuation	Procedure
50	Relay unit	Actuates the relay unit five times at one-second intervals. The "check" indicator on the YDT screen come on each time the relay is actuated.	Check that the relay unit is actuated five times by listening for the operating sound.
51	Radiator fan motor relay	Actuates the radiator fan motor relay five times at five-seconds intervals. The "check" indicator on the YDT screen come on each time the relay is actuated.	Check that the radiator fan motor relay is actuated five times by listening for the operating sound.
52	Headlight	The headlight comes on five times at five-seconds intervals. The "check" indicator on the YDT screen come on each time the headlight is actuated.	Check that the headlight comes on five times.
54	ISC valve	Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 6 seconds each time. The "check" indicator on the YDT screen come on during the operation.	Check that the ISC unit is actuated three times by listening for the operating sound.

EAS20707

EVENT CODE TABLE

Fuel injection system event code table

TIP

The event code numbers listed below cannot be displayed on the meter. To display the event code numbers, use the YDT.

No.	Item	Symptom	Possible causes	Note
192	Intake air pressure sensor	Brief abnormality detected in the intake air pressure sensor	Same as for DTC number P0107 and P0108	Perform the inspection items listed for DTC number P0107 and P0108.
193	Throttle position sensor	Brief abnormality detected in the throttle position sensor	Same as for DTC number P0122 and P0123	Perform the inspection items listed for DTC number P0122 and P0123.
195	Sidestand switch	Brief abnormality detected in the ECU (black/red) input line	Same as for DTC number P1601	Perform the inspection items listed for DTC number P1601.
196	Coolant temperature sensor	Brief abnormality detected in the coolant temperature sensor	Same as for DTC number P0117 and P0118	Perform the inspection items listed for DTC number P0117 and P0118.
197	Intake air temperature sensor	Brief abnormality detected in the intake air temperature sensor	Same as for DTC number P0112 and P0113	Perform the inspection items listed for DTC number P0112 and P0113.
203	Lean angle sensor	Brief abnormality detected in lean angle sensor	Same as for DTC number P1604 and P1605	Perform the inspection items listed for DTC number P1604 and P1605.
240	O ₂ sensor (Stuck at the upper limit for adjustment)	During O ₂ feedback, the adjustment is maintained at the upper limit	<ul style="list-style-type: none"> • Open or short circuit in the wire harness between the sensor and ECU • Drop in fuel pressure • Clogged fuel injector • Fault in sensor • Malfunction in ECU • Malfunction in the fuel injection system 	<ul style="list-style-type: none"> • If a DTC is occurring, respond to that first. * Rarely, Code 240 occurs even when the system is functioning properly.
241	O ₂ sensor (Stuck at the lower limit for adjustment)	During O ₂ feedback, the adjustment is maintained at the lower limit	<ul style="list-style-type: none"> • Open or short circuit in the wire harness between the sensor and ECU • Drop in fuel pressure • Clogged fuel injector • Fault in sensor • Malfunction in ECU • Malfunction in the fuel injection system 	<ul style="list-style-type: none"> • If a DTC is occurring, respond to that first. * Rarely, Code 241 occurs even when the system is functioning properly.

EVENT CODE TABLE

No.	Item	Symptom	Possible causes	Note
242	ISC (Stuck at the upper limit for adjustment)	During idling, the adjustment is maintained at the upper limit	Idling engine speed is slow <ul style="list-style-type: none"> • Clogged throttle body • Poorly adjusted throttle cable • Poorly adjusted clutch cable • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU 	<ul style="list-style-type: none"> • Implement diagnosis code 67, and check the ISC maintenance request. • If a DTC is occurring, respond to that first. * Rarely, Code 242 occurs even when the system is functioning properly.
243	ISC (Stuck at the lower limit for adjustment)	During idling, the adjustment is maintained at the lower limit	Idling engine speed is fast <ul style="list-style-type: none"> • Poorly adjusted throttle cable • Poorly adjusted clutch cable • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU 	<ul style="list-style-type: none"> • If a DTC is occurring, respond to that first. * Rarely, Code 243 occurs even when the system is functioning properly.
244	Poor starting/inability to start	Poor starting/inability to start detected	<ul style="list-style-type: none"> • No gasoline • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU 	<ul style="list-style-type: none"> • If a DTC is occurring, respond to that first. * Rarely, Code 244 occurs even when the system is functioning properly.
245	Engine stop	Engine stop detected	<ul style="list-style-type: none"> • No gasoline • Poorly adjusted throttle cable • Poorly adjusted clutch cable • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU 	<ul style="list-style-type: none"> • If a DTC is occurring, respond to that first. * Rarely, Code 245 occurs even when the system is functioning properly.

ABS event code table

TIP

The event code numbers listed below cannot be displayed on the meter. To display the event code numbers, use the YDT.

EVENT CODE TABLE

No.	Item	Symptom	Possible causes	Note
192	ABS condition when driving	Records ABS condition of last drive	ABS condition of last drive is recorded as FFD. This does not mean a fault condition has been detected. This event code is not deleted. ABS condition <ul style="list-style-type: none"> • ABS ON • Rr ABS OFF • ABS OFF 	—

EAS20552

30_EVENT

EAS33033

TROUBLESHOOTING**Item**

Latch up detected.

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure

1. The vehicle has overturned.
 - Raise the overturned vehicle vertically and check again.
 - Turn the main switch to "ON", then to "OFF", and then back to "ON".

Is the MIL on?**YES**

→ Go to step 2.

NO

→ Service is completed.

2. Installed condition of lean angle sensor.

- Check the installed direction and condition of the sensor.

Is check result OK?**YES**

→ Go to step 3.

NO

- a. Fix the lean angle sensor installation condition.
- b. Turn the main switch to "ON", then to "OFF", and then back to "ON".

Is the MIL on?**YES**

→ Go to step 3.

NO

→ Service is completed.

3. Defective lean angle sensor.

- Execute the diagnostic mode. (Code 08)
- Check that 0.4–1.4 V is displayed when the vehicle is vertical and that the displayed value increases as the vehicle continues to incline.

Is check result OK?**YES**

→ Go to step 4.

NO

- a. Replace the lean angle sensor.
- b. Turn the main switch to "ON", then to "OFF", and then back to "ON".

Is the MIL on?**YES**

→ Go to step 4.

NO

→ Service is completed.

4. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

EAS20554

70_EVENT

EAS33034

TROUBLESHOOTING**Item**

Engine forcibly stops when the vehicle is left idling for a long period.

Procedure**TIP**

If another DTC is displayed at the same time, check the other DTC first and repair it.

1. Allow to idle for a long period.

- Turn the main switch to "OFF".
- Check whether it is possible to start the engine.

Can the engine starting?

YES

→ Service is completed.

NO

→ Go to step 2.

2. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

EAS20897

192_EVENT

EAS33910

TROUBLESHOOTING**Item**

Records ABS condition of last drive.

FFD check item with tool

- Rear ABS
- ABS

Procedure

1. Check ABS condition
 - Check the FFD details recorded for this event code with the tool.
 - Check "Rear ABS OFF" and "ABS OFF" in the FFD display item.
When "Rear ABS OFF" display is ON: Go to item 2.
When ABS OFF display is ON: Go to item 3.
When "Rear ABS OFF" and "ABS OFF" display are OFF: Go to item 4.
2. OFF is displayed for "Rear ABS"
 - ABS condition of last drive is rear ABS OFF
3. OFF is displayed for "ABS"
 - ABS condition of last drive is ABS OFF
4. ON is displayed for both "Rear ABS" and "ABS"
 - ABS condition of last drive is ABS ON

TIP

ABS condition of last drive is recorded. (ABS condition: ABS ON, ABS OFF, or Rear ABS OFF)
This event code does not mean an abnormality has been detected with the vehicle, but the ABS condition of the last drive is recorded as FFD (freeze frame), and is not deleted even when deleting fault codes using YDT.

EAS20397

P0030

EAS33134

TROUBLESHOOTING**Item**

O₂ sensor heater: defective heater controller detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**TIP**

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- P0112, P0113, P0122, P0123

1. Connection of O₂ sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 6, and complete the service.

NO

→ Start the engine, and then check the condition of the DTC.

Is it in the "Recovered" condition?**YES**

→ Go to step 6, and complete the service.

NO

→ Go to step 2.

TIP

For this check, also set the stop/run/start switch to "○".

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Start the engine, and then check the condition of the DTC.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 3.

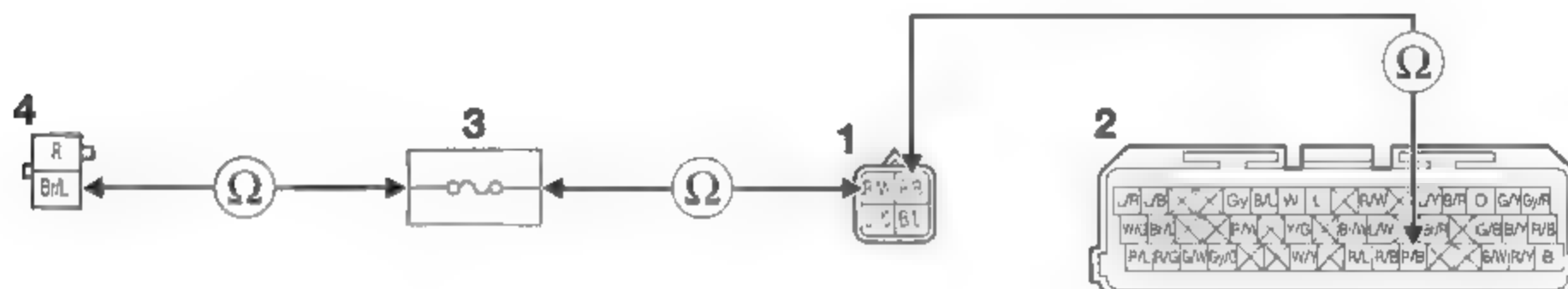
TIP

For this check, also set the stop/run/start switch to "○".

3. Wire harness continuity.

- Disconnect the O₂ sensor coupler "1", ECU coupler "2", ignition fuse "3" and main switch coupler "4".
- Open circuit check

Between O ₂ sensor coupler and ECU coupler	pink/black–pink/black
Between O ₂ sensor coupler and ignition fuse holder	red/white–red/white
Between main switch coupler and ignition fuse holder	brown/blue–brown/blue



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- a. Replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Start the engine, and then check the condition of the DTC.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 4.

TIP

For this check, also set the stop/run/start switch to "○".

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.

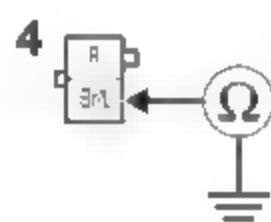
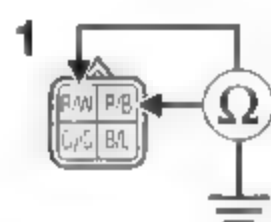
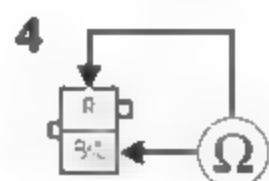
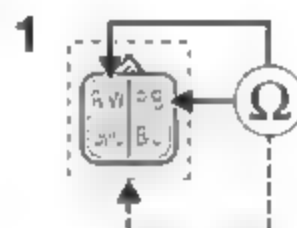
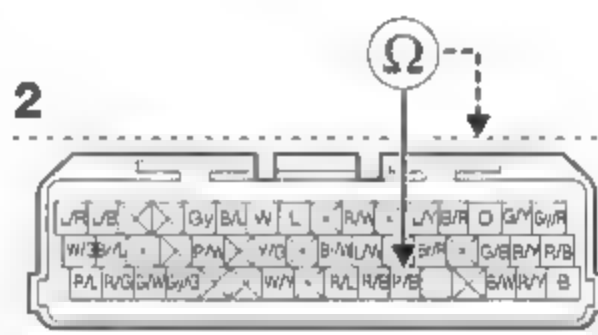
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between O ₂ sensor coupler "1" and ground	red/white-ground pink/black-ground
Between main switch coupler "4" and ground	brown/blue-ground

Lines short circuit check "B"

O ₂ sensor coupler	red/white-any other coupler terminal pink/black-any other coupler terminal
ECU coupler "2"	pink/black-any other coupler terminal
Main switch coupler	brown/blue-red

A**B****2****Is resistance ∞ Ω?****YES**

→ Go to step 4.

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 6, and complete the service.

NO

→ Start the engine, and then check the condition of the DTC.

Is it in the "Recovered" condition?**YES**

→ Go to step 6, and complete the service.

NO

→ Go to step 4.

TIP

For this check, also set the stop/run/start switch to "○".

4. Defective O₂ sensor.

- Replace the O₂ sensor.

Refer to "ENGINE REMOVAL" on page 5-10.

- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Start the engine, and then check the condition of the DTC.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 5.

TIP

For this check, also set the stop/run/start switch to "○".

5. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20980

P00D1, P2195

EAS33115

TROUBLESHOOTING**Item**

- [P00D1] O₂ sensor: heater performance deterioration.
- [P2195] O₂ sensor: open circuit detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**TIP**

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

1. P0657
2. P0030

1. Installed condition of O₂ sensor.

- Check for looseness or pinching.

Is check result OK?**YES**

→ Go to step 2.

NO

- a. Reinstall or replace the O₂ sensor.
Refer to "ENGINE REMOVAL" on page 5-10.
- b. Start the engine and let it idle for approximately 1 minute.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 8, and complete the service.

NO

→ Go to step 2.

2. Connection of O₂ sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Start the engine and let it idle for approximately 1 minute.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 8, and complete the service.

NO

→ Go to step 3.

3. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

- Connect the coupler securely or replace the wire harness.
- Start the engine and let it idle for approximately 1 minute.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 8, and complete the service.

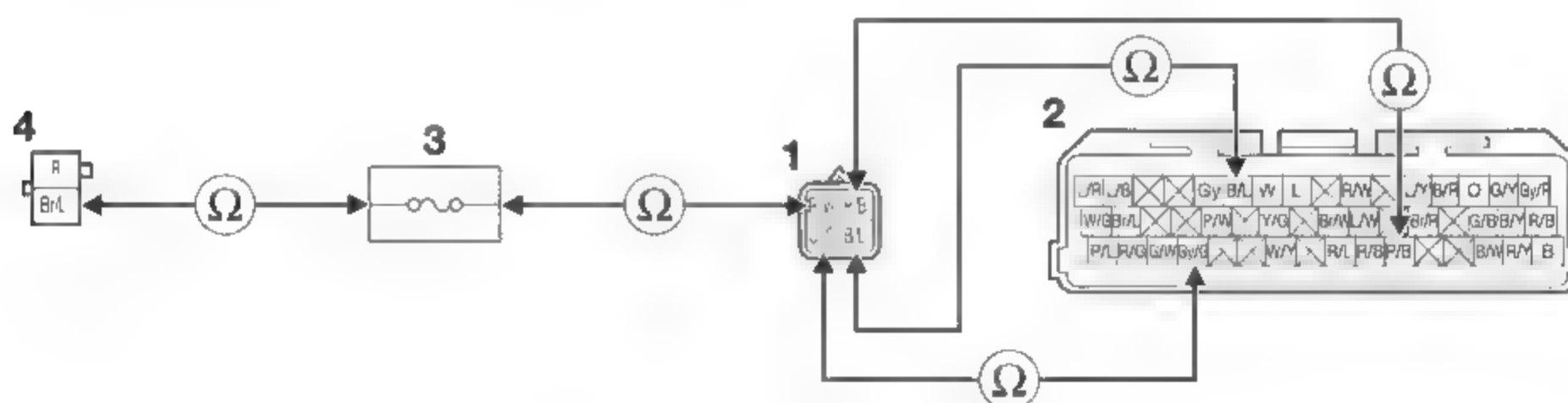
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the O₂ sensor coupler "1", ECU coupler "2", ignition fuse "3" and main switch coupler "4".
- Open circuit check

Between O ₂ sensor coupler and ECU coupler	gray/green–gray/green pink/black–pink/black black/blue–black/blue
Between O ₂ sensor coupler and ignition fuse holder	red/white–red/white
Between main switch coupler and ignition fuse holder	brown/blue–brown/blue



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness.
- Start the engine and let it idle for approximately 1 minute.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 8, and complete the service.

NO

→ Go to step 5.

- Short circuit check

TIP

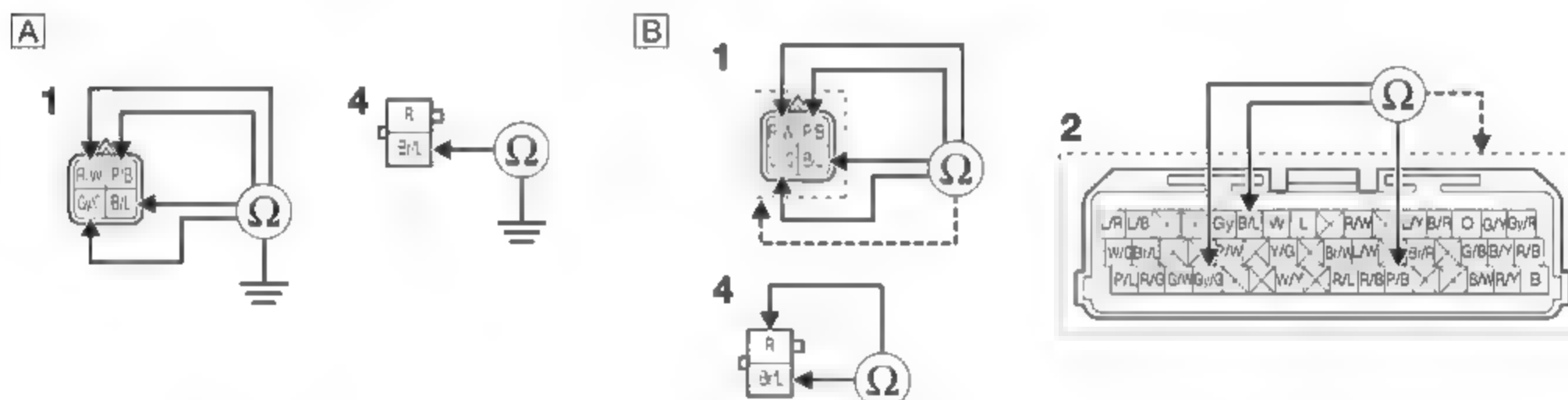
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between O ₂ sensor coupler "1" and ground	gray/green-ground pink/black-ground black/blue-ground red/white-ground
Between main switch coupler "4" and ground	brown/blue-ground

Lines short circuit check "B"

O ₂ sensor coupler	gray/green-any other coupler terminal pink/black-any other coupler terminal black/blue-any other coupler terminal red/white-any other coupler terminal
ECU coupler "2"	gray/green-any other coupler terminal pink/black-any other coupler terminal black/blue-any other coupler terminal
Main switch coupler	brown/blue-red



Is resistance $\infty \Omega$?

YES

→ Go to step 5.

NO

- Replace the wire harness.
- Start the engine and let it idle for approximately 1 minute.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 8, and complete the service.

NO

→ Go to step 5.

5. Check fuel pressure.

- Check the fuel pressure.

Refer to "CHECKING THE FUEL PRESSURE" on page 7-13.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the fuel pump.
Refer to "REMOVING THE FUEL PUMP" on page 7-3.
- b. Start the engine and let it idle for approximately 1 minute.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 8, and complete the service.

NO

→ Go to step 6.

6. Defective O₂ sensor.

- Check the O₂ sensor.

Refer to "ENGINE REMOVAL" on page 5-10.

Is check result OK?

YES

→ Go to step 7.

NO

- a. Replace the O₂ sensor.

Refer to "ENGINE REMOVAL" on page 5-10.

- b. Start the engine and let it idle for approximately 1 minute.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 8, and complete the service.

NO

→ Go to step 7.

7. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

8. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20567

P0107, P0108

EAS33047

TROUBLESHOOTING**Item**

- [P0107] Intake air pressure sensor: ground short circuit detected.
- [P0108] Intake air pressure sensor: open or power short circuit detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**1. Connection of intake air pressure sensor coupler.**

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

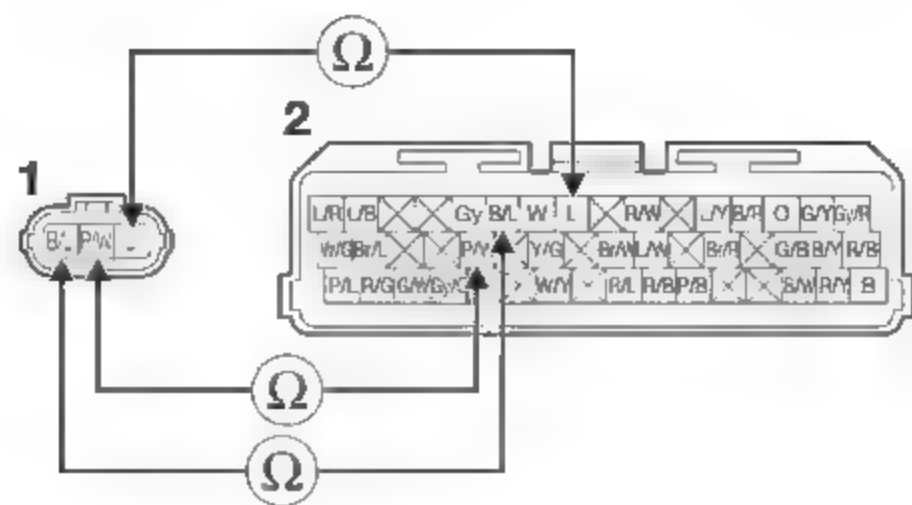
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the intake air pressure sensor coupler "1" and ECU coupler "2".
- Open circuit check

Between intake air pressure sensor coupler and ECU coupler	blue—blue pink/white—pink/white black/blue—black/blue
------------------------------------------------------------	-------------------------------------------------------------



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

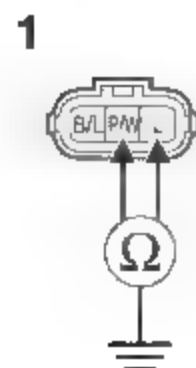
Ground short circuit check “A”

Between intake air pressure sensor coupler “1” and ground	blue—ground pink/white—ground
-----------------------------------------------------------	----------------------------------

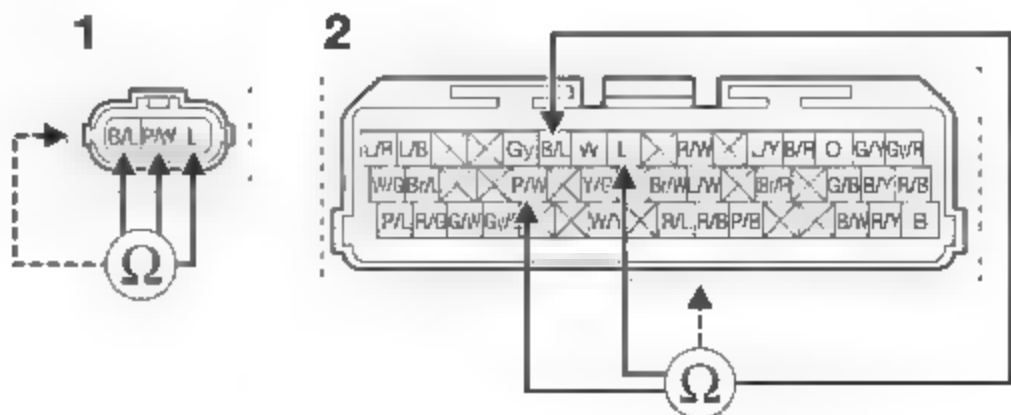
Lines short circuit check “B”

Intake air pressure sensor coupler	blue—any other coupler terminal pink/white—any other coupler terminal black/blue—any other coupler terminal
ECU coupler “2”	blue—any other coupler terminal pink/white—any other coupler terminal black/blue—any other coupler terminal

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

- a. Replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of intake air pressure sensor.

- Check for looseness or pinching.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Reinstall or replace the sensor.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Defective intake air pressure sensor.

- Execute the diagnostic mode. (Code 04)
- When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated.

At sea level	Approx. 101 kPa (757.6 mmHg, 29.8 inHg), approx. 3.64 V
1000 m (3300 ft) above sea level	Approx. 90 kPa (675.1 mmHg, 26.6 inHg), approx. 3.30 V
2000 m (6700 ft) above sea level	Approx. 80 kPa (600.0 mmHg, 23.6 inHg), approx. 3.00 V
3000 m (9800 ft) above sea level	Approx. 70 kPa (525.0 mmHg, 20.7 inHg), approx. 2.70 V

- When engine is cranking: Make sure that the indication value changes.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the intake air pressure sensor.
Refer to "THROTTLE BODIES" on page 7-6.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20568

P0112, P0113

EAS33048

TROUBLESHOOTING**Item**

- [P0112] Intake air temperature sensor: ground short circuit detected.
- [P0113] Intake air temperature sensor: open or power short circuit detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**TIP**

Perform this procedure when the engine is cold.

1. Connection of intake air temperature sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

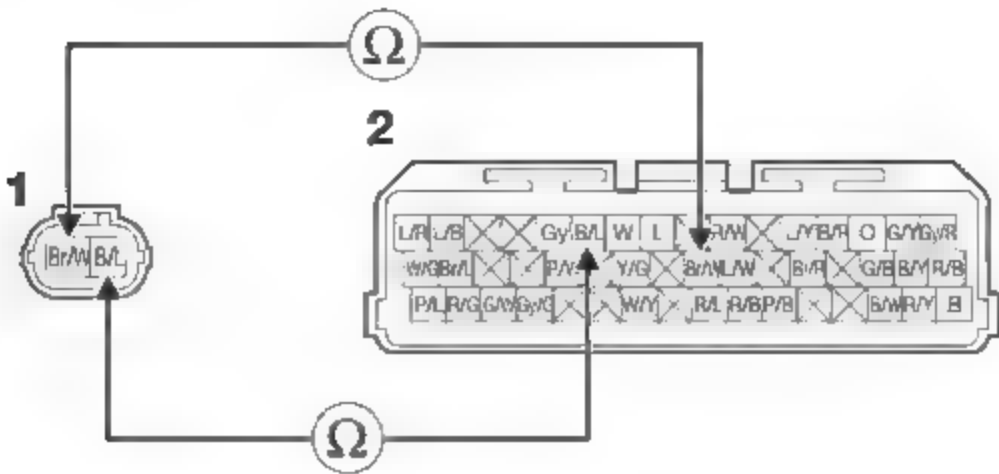
→ Go to step 3.

3. Wire harness continuity.

- Disconnect the intake air temperature sensor coupler "1" and ECU coupler "2".

• Open circuit check

Between intake air temperature sensor coupler and ECU coupler	brown/white–brown/white black/blue–black/blue
---------------------------------------------------------------	------------------------------------------------------------------------



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

• Short circuit check

TIP Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between intake air temperature sensor coupler “1” and ground	brown/white–ground
--------------------------------------------------------------	-------------------------------

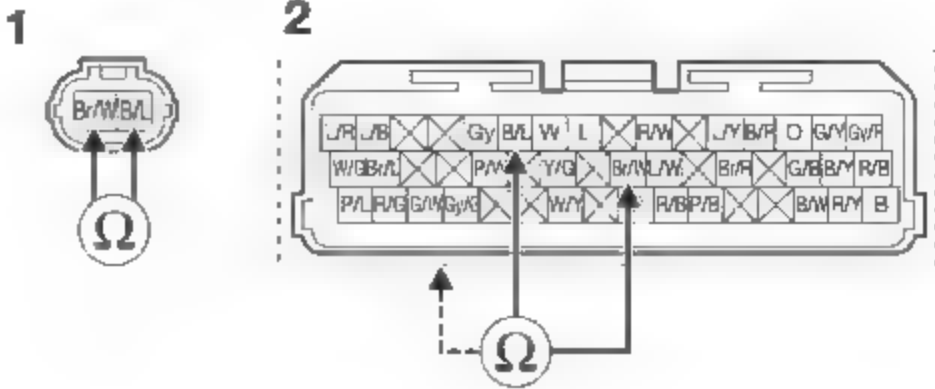
Lines short circuit check “B”

Intake air temperature sensor coupler	brown/white–black/blue
ECU coupler “2”	brown/white–any other coupler terminal black/blue–any other coupler terminal

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

- a. Replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of intake air temperature sensor.

- Check for looseness or pinching.

Refer to "GENERAL CHASSIS (4)" on page 4-8.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Reinstall the sensor.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Defective intake air temperature sensor.

- Execute the diagnostic mode. (Code 05)
- When engine is cold: Displayed temperature is close to the ambient temperature.
- The displayed temperature is not close to the ambient temperature → Check the intake air temperature sensor.

Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-47.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the intake air temperature sensor.
Refer to "GENERAL CHASSIS (4)" on page 4-8.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20569

P0117, P0118

EAS33049

TROUBLESHOOTING**Item**

- [P0117] Coolant temperature sensor: ground short circuit detected.
- [P0118] Coolant temperature sensor: open or power short circuit detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**TIP**

Perform this procedure when the engine is cold.

1. Connection of coolant temperature sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the sub-wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 8, and complete the service.

NO

→ Go to step 2.

2. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness and/or sub-wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 8, and complete the service.

NO

→ Go to step 3.

3. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 8, and complete the service.

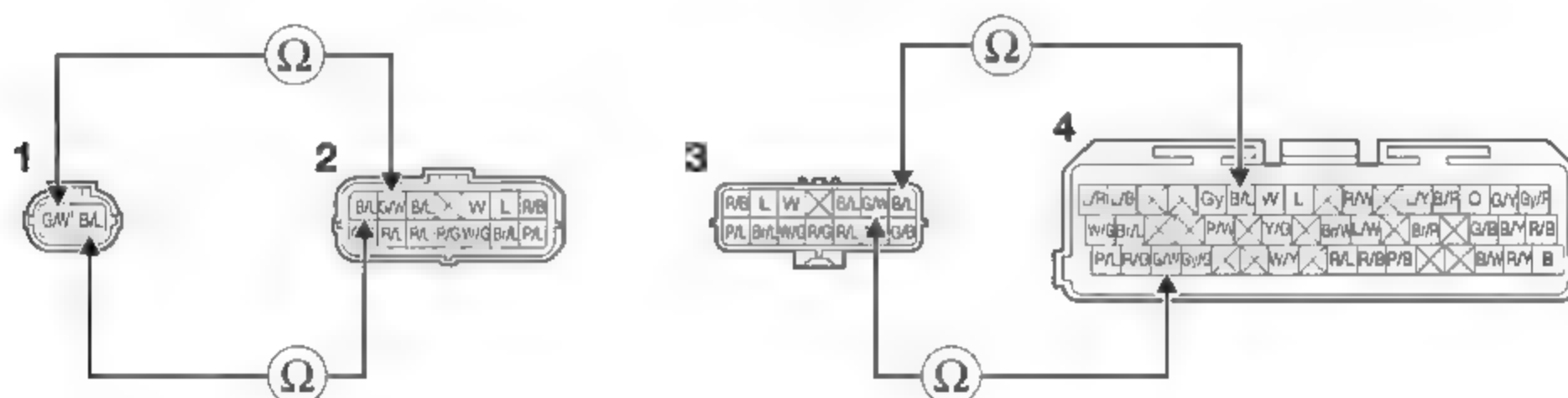
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the coolant temperature sensor coupler "1", sub-wire harness coupler (wire harness side) "2", wire harness coupler (sub-wire harness side) "3" and ECU coupler "4".
- Open circuit check

Between coolant temperature sensor coupler and sub-wire harness coupler (wire harness side)	green/white—green/white black/blue—black/blue
Between wire harness coupler (sub-wire harness side) and ECU coupler	green/white—green/white black/blue—black/blue



Is resistance 0 Ω?

YES

→ Go to step "Short circuit check".

NO

- Replace the wire harness and/or sub-wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 8, and complete the service.

NO

→ Go to step 5.

- Short circuit check

TIP

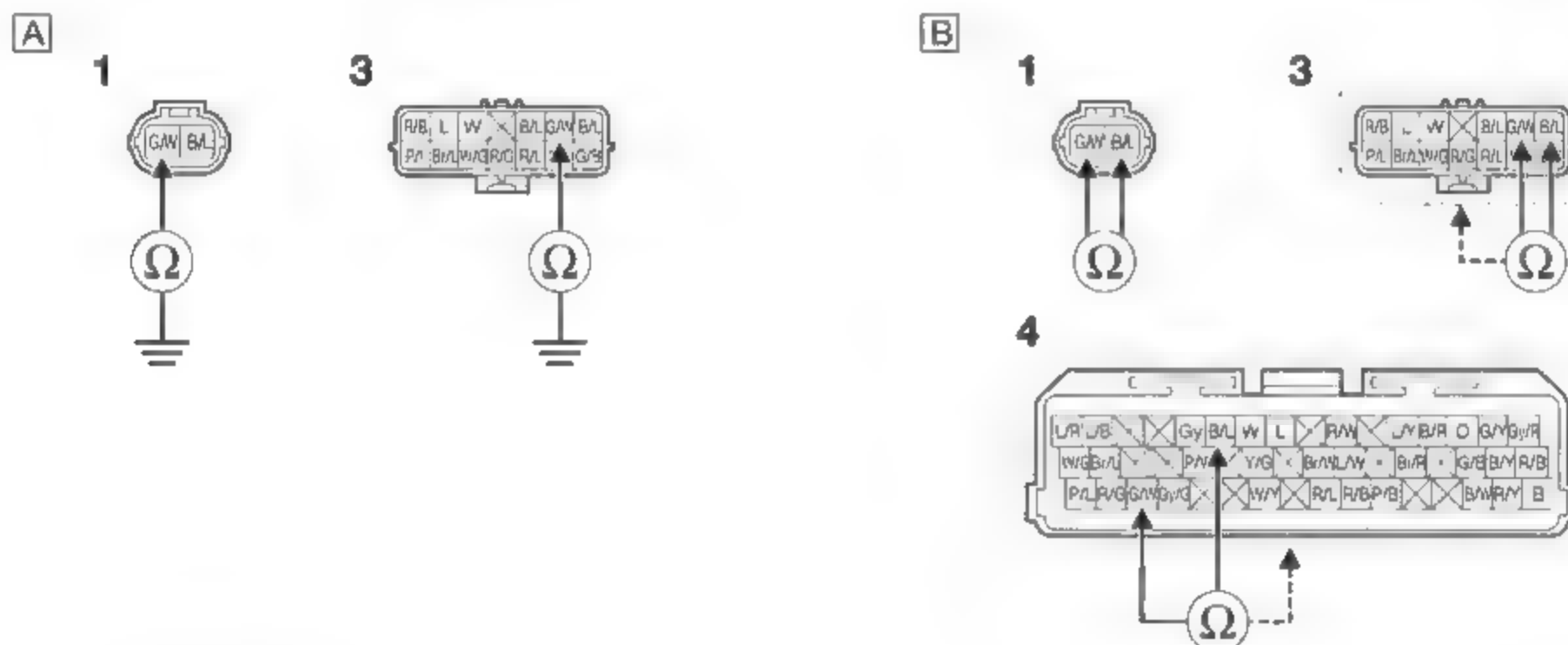
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between coolant temperature sensor coupler "1" and ground	green/white-ground
Between wire harness coupler (sub-wire harness side) "3" and ground	green/white-ground

Lines short circuit check "B"

Coolant temperature sensor coupler	green/white-black/blue
Wire harness coupler (sub-wire harness side)	green/white-any other coupler terminal black/blue-any other coupler terminal
ECU coupler "4"	green/white-any other coupler terminal black/blue-any other coupler terminal



Is resistance $\infty \Omega$?

YES

→ Go to step 5.

NO

- Replace the wire harness and/or sub-wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 8, and complete the service.

NO

→ Go to step 5.

5. Installed condition of coolant temperature sensor.

- Check for looseness or pinching.

Refer to "THROTTLE BODIES" on page 7-6.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Reinstall the sensor.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 8, and complete the service.

NO

→ Go to step 6.

6. Defective coolant temperature sensor.

- Execute the diagnostic mode. (Code 06)
- When engine is cold: Displayed temperature is close to the ambient temperature.
- The displayed temperature is not close to the ambient temperature → Check the coolant temperature sensor.

Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-45.

Is check result OK?

YES

→ Go to step 7.

NO

- a. Replace the coolant temperature sensor.
Refer to "THROTTLE BODIES" on page 7-6.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 8, and complete the service.

NO

→ Go to step 7.

7. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

8. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20757

P0122, P0123

EAS33050

TROUBLESHOOTING**Item**

- [P0122] Throttle position sensor: open or ground short circuit detected.
- [P0123] Throttle position sensor: power short circuit detected.

Fail-safe system

- Able/Unable to start engine
- Able/Unable to drive vehicle

Procedure**1. Connection of throttle position sensor coupler.**

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the sub-wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 9, and complete the service.

NO

→ Go to step 2.

2. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness and/or sub-wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 9, and complete the service.

NO

→ Go to step 3.

3. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 9, and complete the service.

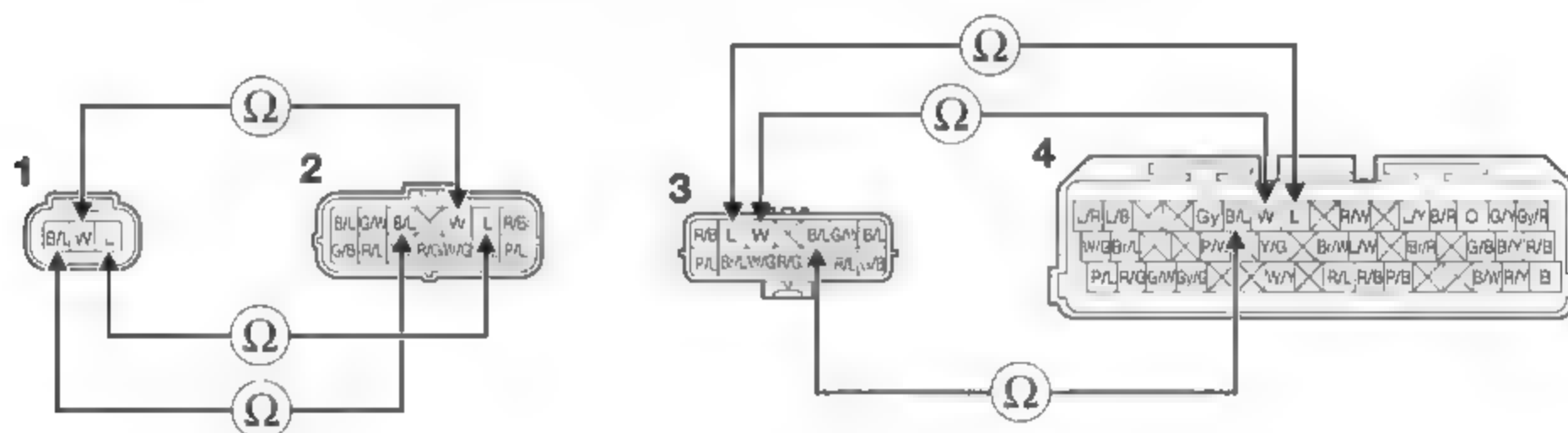
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the throttle position sensor coupler "1", sub-wire harness coupler (wire harness side) "2", wire harness coupler (sub-wire harness side) "3" and ECU coupler "4".
- Open circuit check

Between throttle position sensor coupler and sub-wire harness coupler (wire harness side)	black/blue-black/blue white-white blue-blue
Between wire harness coupler (sub-wire harness side) and ECU coupler	black/blue-black/blue white-white blue-blue



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- a. Replace the wire harness and/or sub-wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 9, and complete the service.

NO

→ Go to step 5.

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

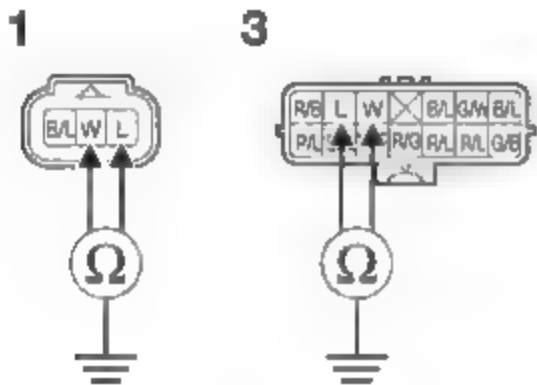
Ground short circuit check “A”

Between throttle position sensor coupler “1” and ground	white-ground blue-ground
Between wire harness coupler (sub-wire harness side) “3” and ground	white-ground blue-ground

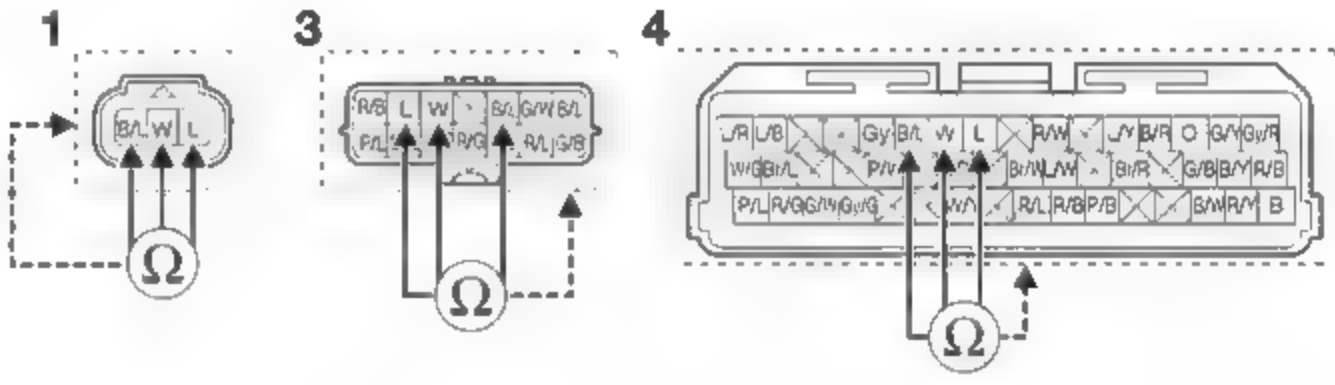
Lines short circuit check “B”

Throttle position sensor coupler	black/blue-any other coupler terminal white-any other coupler terminal blue-any other coupler terminal
Wire harness coupler (sub-wire harness side)	black/blue-any other coupler terminal white-any other coupler terminal blue-any other coupler terminal
ECU coupler “4”	black/blue-any other coupler terminal white-any other coupler terminal blue-any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 5.

NO

- a. Replace the wire harness and/or sub-wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 9, and complete the service.

NO

→ Go to step 5.

5. Installed condition of throttle position sensor.

- Check for looseness or pinching.

Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-12.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Reinstall or adjust the sensor.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 9, and complete the service.

NO

→ Go to step 6.

6. Throttle position sensor resistance.

- Measure the throttle position sensor resistance.

Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-46.

Is check result OK?

YES

→ Go to step 7.

NO

- a. Replace the throttle position sensor.

Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-12.

- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 9, and complete the service.

NO

→ Go to step 7.

7. Defective throttle position sensor.

- Check throttle position sensor signal.
- Execute the diagnostic mode. (Code 01)

When the throttle valves are fully closed	11-21
When throttle valves are fully open	96-106

Is check result OK?

YES

→ Go to step 8.

NO

- a. Replace the throttle position sensor.

Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-12.

- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 9, and complete the service.

NO

→ Go to step 8.

8. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

9. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS2057¹**P0132**EAS3305¹**TROUBLESHOOTING****Item**

O₂ sensor: short circuit detected (power short circuit).

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

1. Installed condition of O₂ sensor.

- Check for looseness or pinching.
Refer to "ENGINE REMOVAL" on page 5-10.

Is check result OK?

YES

→ Go to step 2.

NO

- a. Reinstall or replace the sensor.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of O₂ sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 3.

3. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

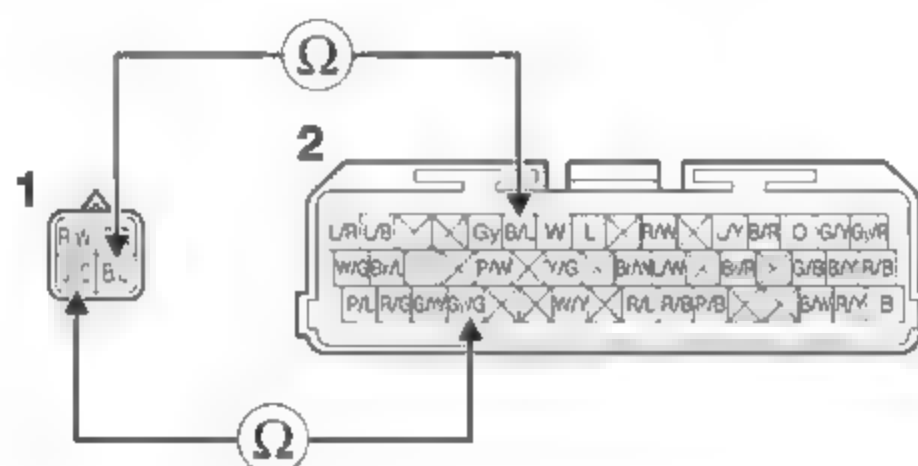
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the O₂ sensor coupler "1" and ECU coupler "2".
- Open circuit check

Between O ₂ sensor coupler and ECU coupler	black/blue-black/blue gray/green-gray/green
-------------------------------------------------------	------------------------------------------------



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between O ₂ sensor coupler "1" and ground	gray/green-ground
------------------------------------------------------	-------------------

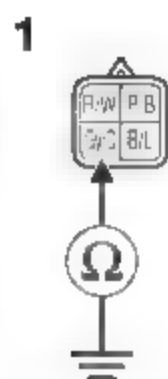
Lines short circuit check "B"

O ₂ sensor coupler	black/blue-any other coupler terminal gray/green-any other coupler terminal
-------------------------------	--------------------------------------------------------------------------------

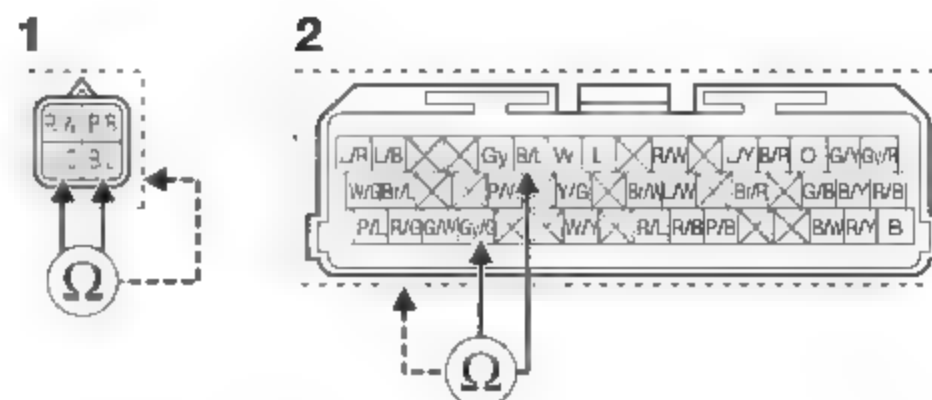
ECU coupler "2"

 black/blue—any other coupler terminal
 gray/green—any other coupler terminal

A



B

Is resistance $\infty \Omega$?**YES**

→ Go to step 5.

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Defective O₂ sensor.

- Check the O₂ sensor.

Refer to "ENGINE REMOVAL" on page 5-10.

Is check result OK?

YES

→ Go to step 6.

NO

- Replace the O₂ sensor.
Refer to "ENGINE REMOVAL" on page 5-10.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20574

P0201

EAS33054

TROUBLESHOOTING**Item**

Fuel injector #1: malfunction in fuel injector #1.

Fail-safe system

- Able to start engine (depending on the number of faulty cylinders)
- Able to drive vehicle (depending on the number of faulty cylinders)

Procedure

1. Connection of fuel injector #1 coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the sub-wire harness.
- b. Execute the diagnostic mode. (Code 36)

Is it hear operating sound?

YES

→ Go to step 7.

NO

→ Go to step 2.

2. Defective fuel injector #1.

- Measure the fuel injector resistance.

Refer to "CHECKING THE FUEL INJECTORS" on page 8-48.

Is check result OK?

YES

→ Go to step 3.

NO

- a. Replace the fuel injector #1.
Refer to "THROTTLE BODIES" on page 7-6.
- b. Execute the diagnostic mode. (Code 36)

Is it hear operating sound?

YES

→ Go to step 7.

NO

→ Go to step 3.

3. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code 36)

Is it hear operating sound?

YES

→ Go to step 7.

NO

→ Go to step 4.

4. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 5.

NO

- a. Connect the coupler securely or replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 36)

Is it hear operating sound?

YES

→ Go to step 7.

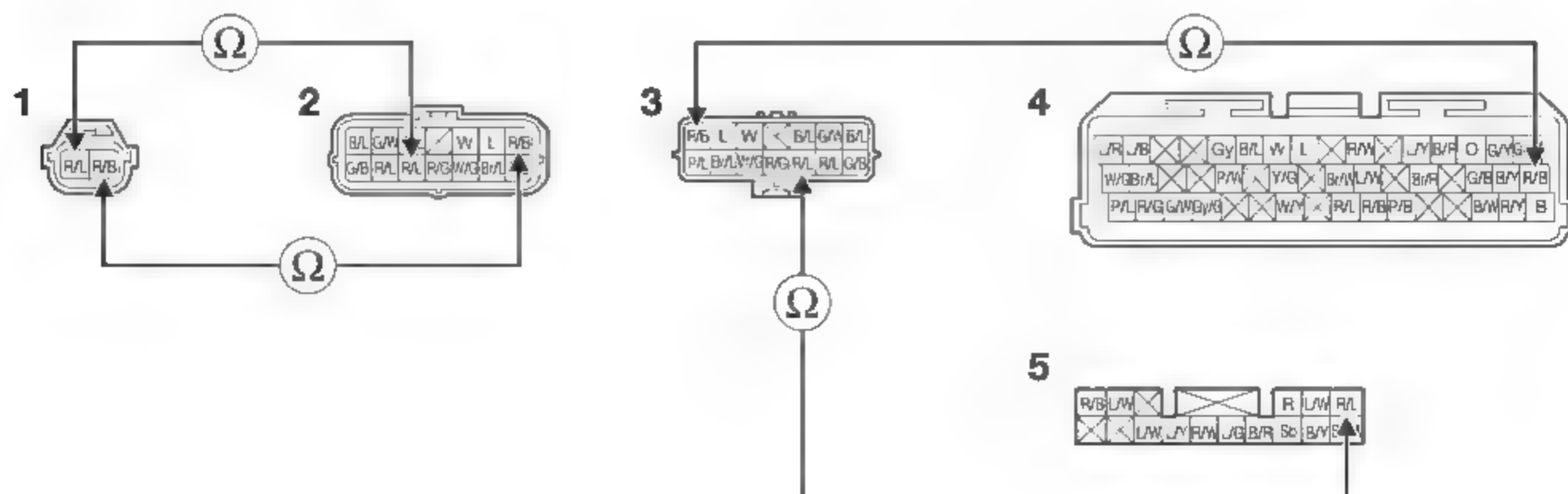
NO

→ Go to step 5.

5. Wire harness continuity.

- Disconnect the fuel injector #1 coupler "1", sub-wire harness coupler (wire harness side) "2", wire harness coupler (sub-wire harness side) "3" ECU coupler "4" and relay unit coupler "5"
- Open circuit check

Between fuel injector #1 coupler and sub-wire harness coupler (wire harness side)	red/black-red/black red/blue-red/blue
Between wire harness coupler (sub-wire harness side) and relay unit coupler	red/blue-red/blue
Between wire harness coupler (sub-wire harness side) and ECU coupler	red/black-red/black



Is resistance 0 Ω ?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness and/or sub-wire harness.
- Execute the diagnostic mode. (Code 36)

Is it hear operating sound?

YES

→ Go to step 7.

NO

→ Go to step 6.

• Short circuit check

TIP

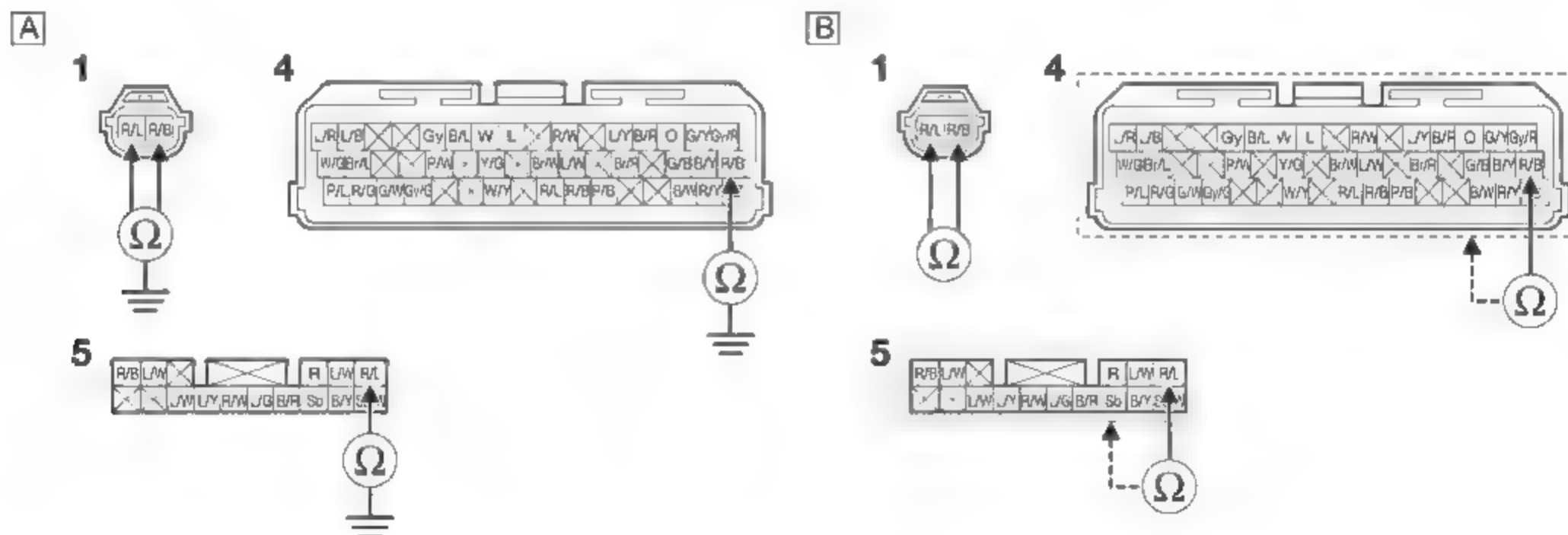
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between fuel injector #1 coupler "1" and ground	red/black-ground red/blue-ground
Between ECU coupler "4" and ground	red/black-ground
Between relay unit coupler "5" and ground	red/blue-ground

Lines short circuit check "B"

Fuel injector #1 coupler	red/black-red/blue
ECU coupler	red/black-any other coupler terminal
Relay unit coupler	red/blue-any other coupler terminal



Is resistance $\infty \Omega$?

YES

→ Go to step 6.

NO

- Replace the wire harness and/or sub-wire harness.
- Execute the diagnostic mode. (Code 36)

Is it hear operating sound?

YES

→ Go to step 7.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Start the engine and let it idle for approximately 5 seconds.
- Confirm that the DTC has a condition of "Recovered" using the malfunction mode of the YDT, and then delete the DTC.

EAS20575

P0202**TROUBLESHOOTING****Item**

Fuel injector #2: malfunction in fuel injector #2.

Fail-safe system

- Able to start engine (depending on the number of faulty cylinders)
- Able to drive vehicle (depending on the number of faulty cylinders)

Procedure

1. Connection of fuel injector #2 coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the sub-wire harness.
- b. Execute the diagnostic mode. (Code 37)

Is it hear operating sound?

YES

→ Go to step 7.

NO

→ Go to step 2.

2. Defective fuel injector #2.

- Measure the fuel injector resistance.

Refer to "CHECKING THE FUEL INJECTORS" on page 8-48.

Is check result OK?

YES

→ Go to step 3.

NO

- a. Replace the fuel injector #2.
Refer to "THROTTLE BODIES" on page 7-6.
- b. Execute the diagnostic mode. (Code 37)

Is it hear operating sound?

YES

→ Go to step 7.

NO

→ Go to step 3.

3. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code 37)

Is it hear operating sound?

YES

→ Go to step 7.

NO

→ Go to step 4.

4. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 5.

NO

- a. Connect the coupler securely or replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 37)

Is it hear operating sound?

YES

→ Go to step 7.

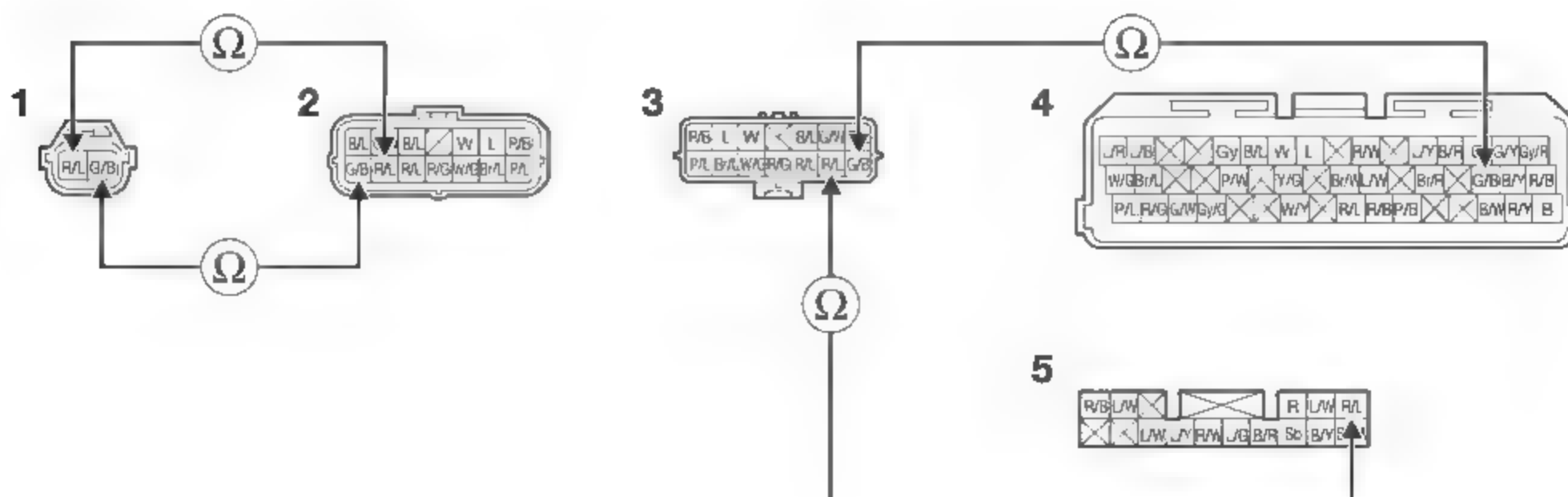
NO

→ Go to step 5.

5. Wire harness continuity.

- Disconnect the fuel injector #2 coupler "1", sub-wire harness coupler (wire harness side) "2", wire harness coupler (sub-wire harness side) "3", ECU coupler "4" and relay unit coupler "5"
- Open circuit check

Between fuel injector #2 coupler and sub-wire harness coupler (wire harness side)	green/black-green/black red/blue-red/blue
Between wire harness coupler (sub-wire harness side) and relay unit coupler	red/blue-red/blue
Between wire harness coupler (sub-wire harness side) and ECU coupler	green/black-green/black



Is resistance 0 Ω ?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness and/or sub-wire harness.
- Execute the diagnostic mode. (Code 37)

Is it hear operating sound?

YES

→ Go to step 7.

NO

→ Go to step 6.

• Short circuit check

TIP

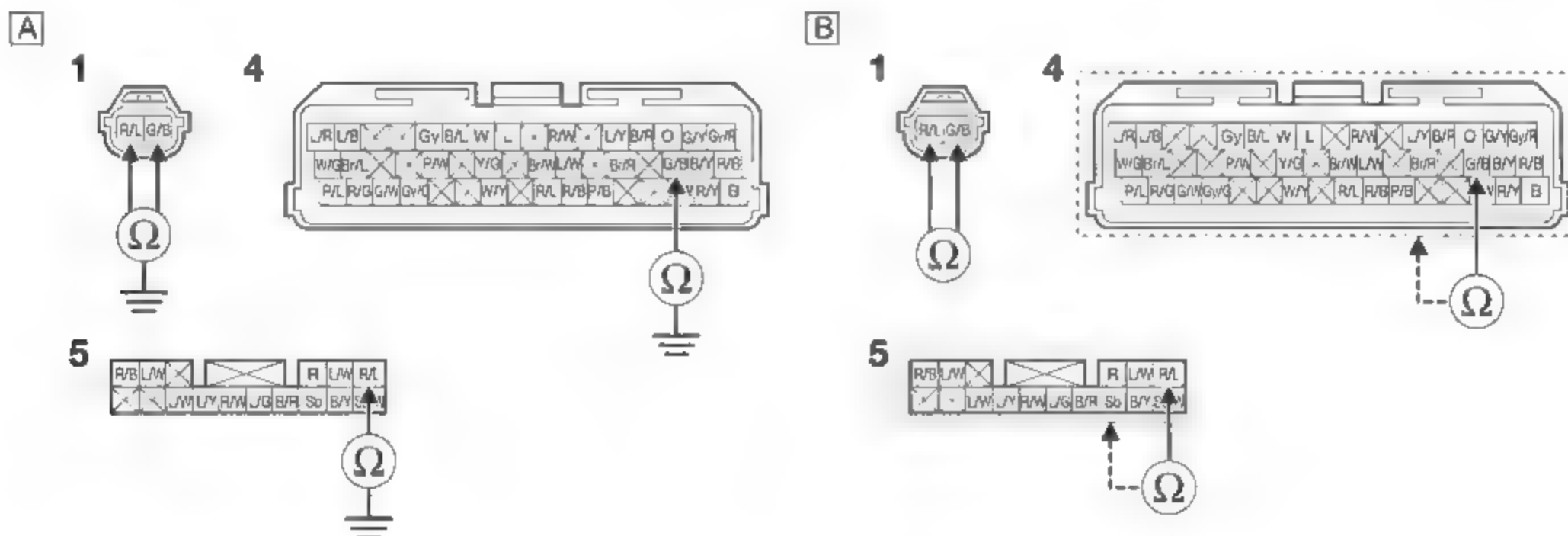
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between fuel injector #2 coupler "1" and ground	green/black-ground red/blue-ground
Between ECU coupler "4" and ground	green/black-ground
Between relay unit coupler "5" and ground	red/blue-ground

Lines short circuit check "B"

Fuel injector #2 coupler	green/black-red/blue
ECU coupler	green/black-any other coupler terminal
Relay unit coupler	red/blue-any other coupler terminal



Is resistance $\infty \Omega$?

YES

→ Go to step 6.

NO

- Replace the wire harness and/or sub-wire harness.
- Execute the diagnostic mode. (Code 37)

Is it hear operating sound?

YES

→ Go to step 7.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Start the engine and let it idle for approximately 5 seconds.
- Confirm that the DTC has a condition of "Recovered" using the malfunction mode of the YDT, and then delete the DTC.

EAS20578

P0335

EAS33058

TROUBLESHOOTING

Item

Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure

1. Connection of crankshaft position sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of wire harness ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

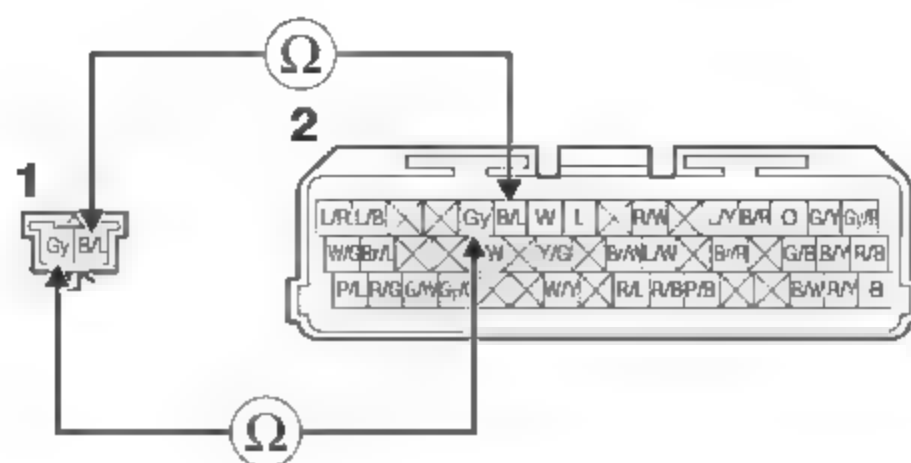
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the crankshaft position sensor coupler "1" and ECU coupler "2".
- Open circuit check

Between crankshaft position sensor coupler and ECU coupler	black/blue-black/blue gray-gray
------------------------------------------------------------	------------------------------------



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness.
- Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between crankshaft position sensor coupler "1" and ground	gray-ground
-----------------------------------------------------------	-------------

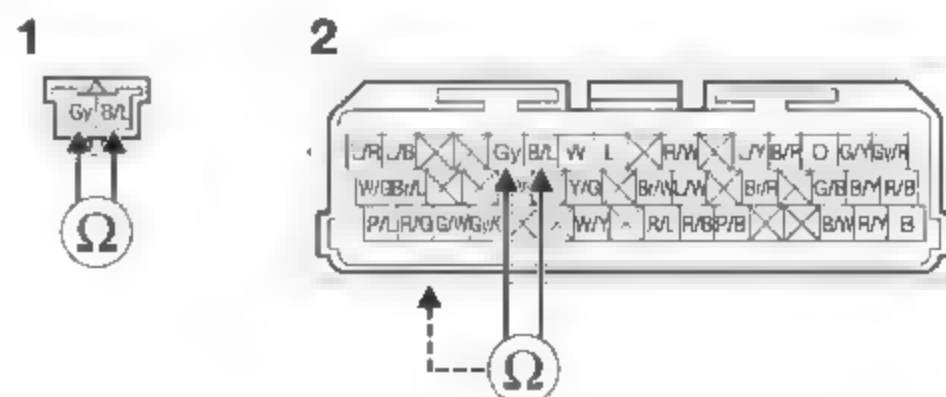
Lines short circuit check "B"

Crankshaft position sensor coupler	black/blue-gray
ECU coupler "2"	black/blue-any other coupler terminal gray-any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 4.

NO

- a. Replace the wire harness.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of crankshaft position sensor.

- Check for looseness or pinching.
- Check the gap (0.85 mm (0.03 in)) between the crankshaft position sensor and the generator rotor.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Reinstall or replace the sensor.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Defective crankshaft position sensor.

- Check the crankshaft position sensor.

Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-42.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the crankshaft position sensor.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20580

P0351

EAS33060

TROUBLESHOOTING**Item**

Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure**1. Connection of cylinder-#1 ignition coil coupler.**

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

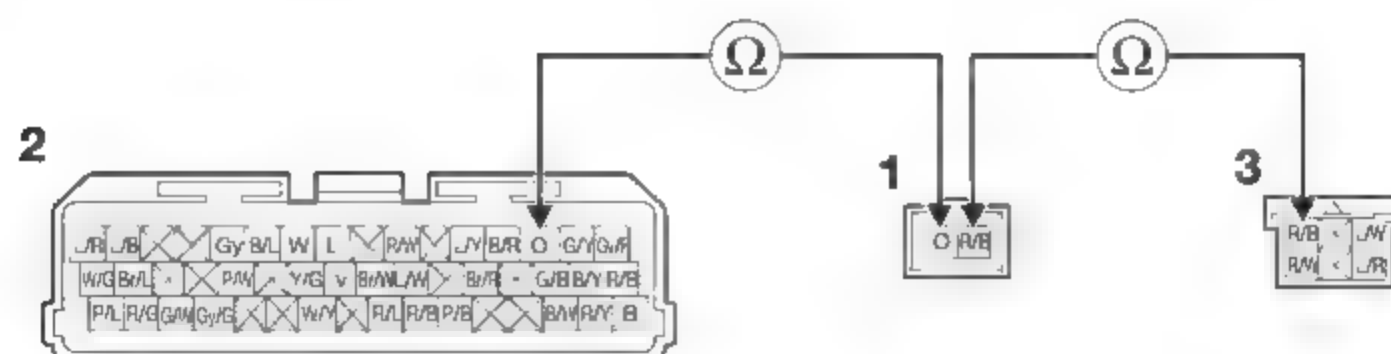
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the cylinder-#1 ignition coil coupler "1", ECU coupler "2" and handlebar switch (right) coupler "3".
- Open circuit check

Between cylinder-#1 ignition coil coupler and ECU coupler	orange–orange
Between cylinder-#1 ignition coil coupler and handlebar switch (right) coupler	red/black–red/black



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- Replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between cylinder-#1 ignition coil coupler “1” and ground	orange–ground red/black–ground
----------------------------------------------------------	-----------------------------------

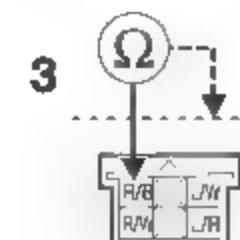
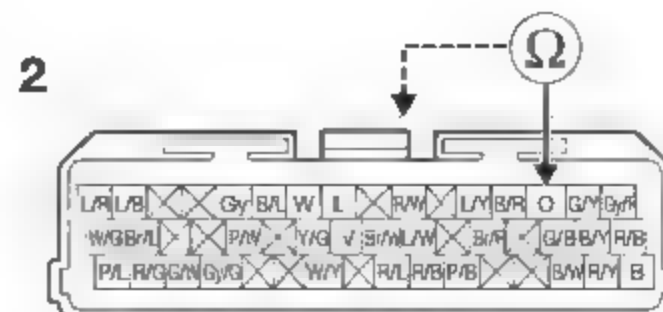
Lines short circuit check “B”

Cylinder-#1 ignition coil coupler	orange–red/black
ECU coupler “2”	orange–any other coupler terminal
Handlebar switch (right) coupler “3”	red/black–any other coupler terminal

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

- a. Replace the wire harness.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of cylinder-#1 ignition coil.

- Check for looseness or pinching.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Reinstall or replace the ignition coil.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Defective cylinder-#1 ignition coil.

- Measure the primary coil resistance of the cylinder-#1 ignition coil.
Refer to "CHECKING THE IGNITION COILS" on page 8-41.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the cylinder-#1 ignition coil.
Refer to "CAMSHAFTS" on page 5-20.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Execute the diagnostic mode. (Code 30)
- Confirm that spark plug does not sparking.

-
- Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.
7. Delete the DTC and check that the MIL goes off.
- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20581

P0352

EAS33061

TROUBLESHOOTING**Item**

Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure**1. Connection of cylinder-#2 ignition coil coupler.**

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

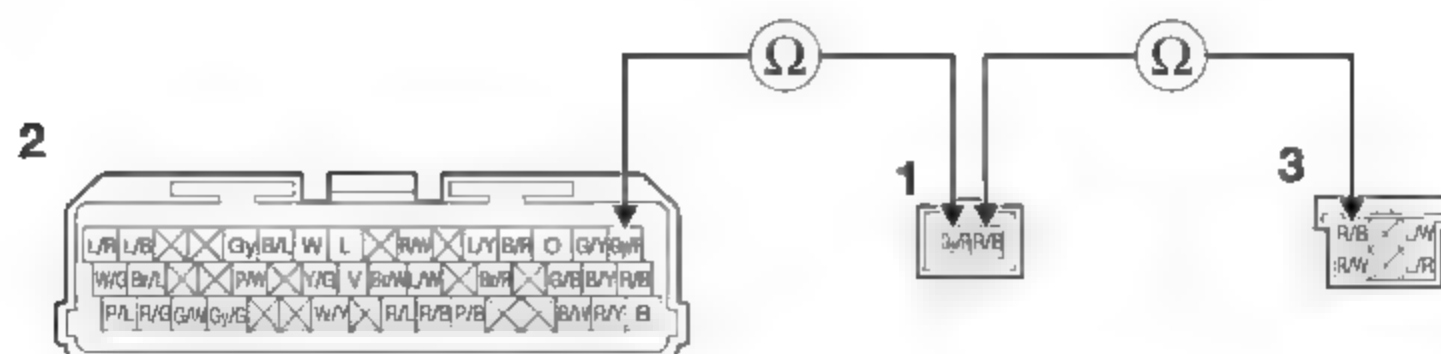
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the cylinder-#2 ignition coil coupler "1", ECU coupler "2" and handlebar switch (right) coupler "3".
- Open circuit check

Between cylinder-#2 ignition coil coupler and ECU coupler	gray/red-gray/red
Between cylinder-#2 ignition coil coupler and handlebar switch (right) coupler	red/black-red/black



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between cylinder-#2 ignition coil coupler "1" and ground	gray/red-ground red/black-ground
----------------------------------------------------------	-------------------------------------

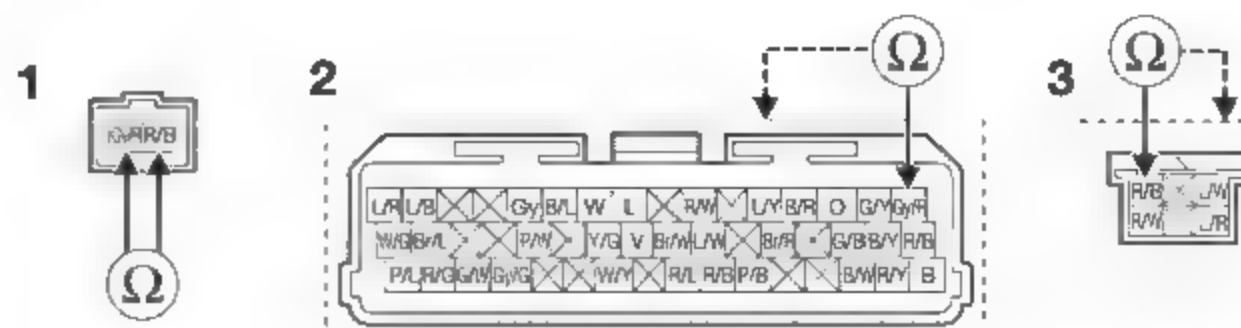
Lines short circuit check "B"

Cylinder-#2 ignition coil coupler	gray/red-red/black
ECU coupler "2"	gray/red-any other coupler terminal
Handlebar switch (right) coupler "3"	red/black-any other coupler terminal

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

- a. Replace the wire harness.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of cylinder-#2 ignition coil.

- Check for looseness or pinching.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Reinstall or replace the ignition coil.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Defective cylinder-#2 ignition coil.

- Measure the primary coil resistance of the cylinder-#2 ignition coil.
Refer to "CHECKING THE IGNITION COILS" on page 8-41.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the cylinder-#2 ignition coil.
Refer to "CAMSHAFTS" on page 5-20.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Execute the diagnostic mode. (Code 31)
- Confirm that spark plug does not sparking.

-
- Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.
7. Delete the DTC and check that the MIL goes off.
- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20785

P0458

EAS38528

TROUBLESHOOTING**Item**

Purge cut valve solenoid: open circuit detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**1. Connection of purge cut valve solenoid coupler.**

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

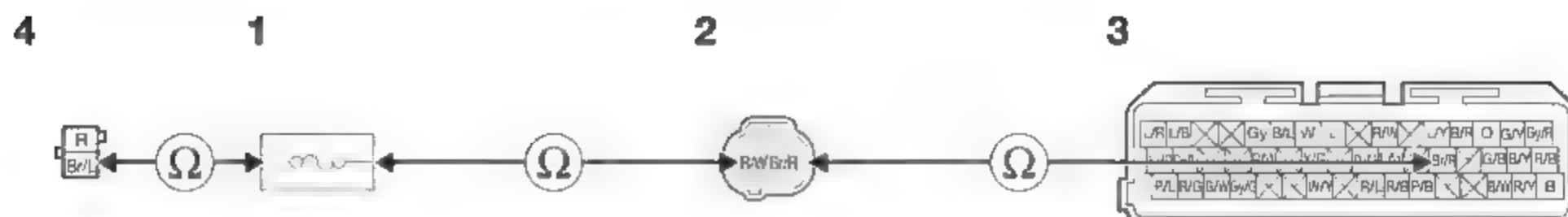
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the ignition fuse "1", purge cut valve solenoid coupler "2", ECM coupler "3" and main switch coupler "4".
- Open circuit check

Between ignition fuse holder and purge cut valve solenoid coupler	red/white–red/white
Between purge cut valve solenoid coupler and ECU coupler	brown/red–brown/red
Between main switch coupler and ignition fuse holder	brown/blue–brown/blue



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

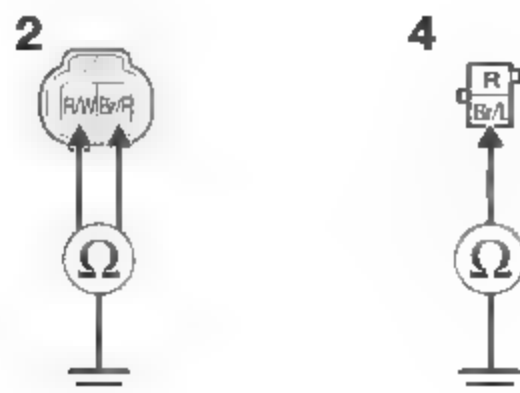
Ground short circuit check "A"

Between purge cut valve solenoid coupler "2" and ground	red/white–ground brown/red–ground
Between main switch coupler "4" and ground	brown/blue–ground

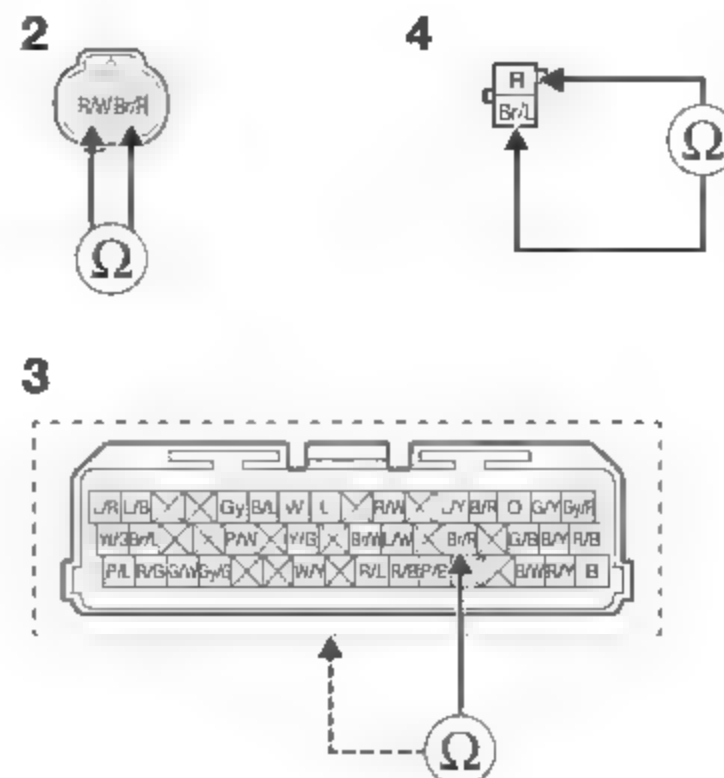
Lines short circuit check "B"

Purge cut valve solenoid coupler	red/white–brown/red
ECU coupler "3"	brown/red–any other coupler terminal
Main switch coupler	brown/blue–red

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of purge cut valve solenoid.

- Check for looseness or pinching.

Refer to "FUEL TANK" on page 7-1.

Is check result OK?

YES

→ Go to step 5.

NO

- Reinstall or replace the purge cut valve solenoid.
Refer to "FUEL TANK" on page 7-1.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Defective purge cut valve solenoid.

- Execute the diagnostic mode. (Code 46)

Is it hear operating sound?

YES

→ Go to step 7, and complete the service.

NO

→ Check the purge cut valve solenoid.

Refer to "CHECKING THE PURGE CUT VALVE SOLENOID" on page 8-48.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the purge cut valve solenoid.

b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20585

P0480**TROUBLESHOOTING****Item**

Radiator fan motor relay: open or short circuit detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**1. Connection of radiator fan motor relay coupler.**

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 6, and complete the service.

NO

→ Go to step 2.

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 6, and complete the service.

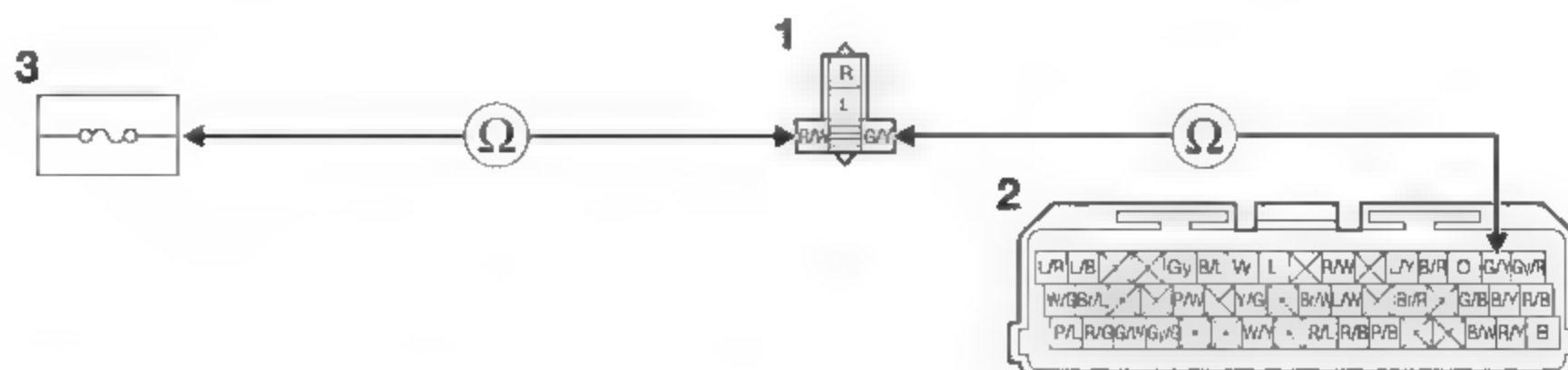
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the radiator fan motor relay "1", ECU coupler "2" and ignition fuse "3".
- Open circuit check

Between radiator fan motor relay and ignition fuse holder	red/white–red/white
Between radiator fan motor relay and ECU coupler	green/yellow–green/yellow



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 4.

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

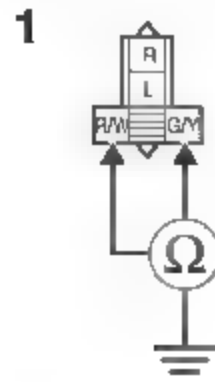
Ground short circuit check "A"

Between radiator fan motor relay "1" and ground	green/yellow–ground red/white–ground
-------------------------------------------------	-----------------------------------------

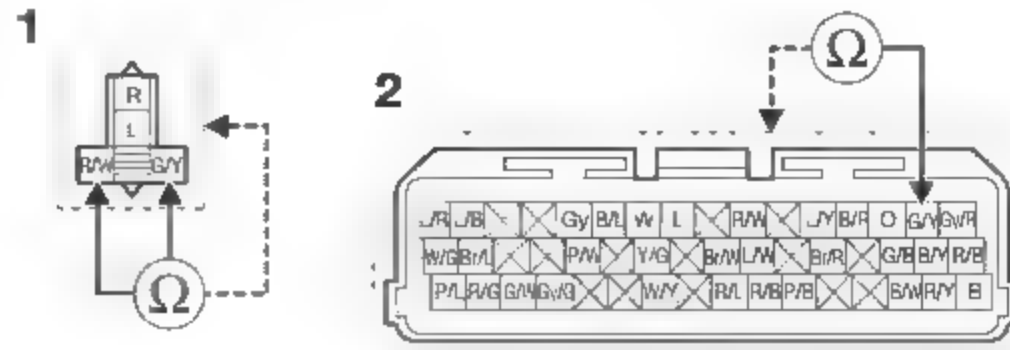
Lines short circuit check "B"

Radiator fan motor relay	green/yellow–any other coupler terminal red/white–any other coupler terminal
ECU coupler "2"	green/yellow–any other coupler terminal

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 4.

4. Defective radiator fan motor relay.

- Replace the radiator fan motor relay.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20589

P0507

EAS33069

TROUBLESHOOTING**Item**

Engine idling speed is too high.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**TIP**

- If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.
- P0560, P1500

1. Locate the malfunction.

- Execute the diagnostic mode. (Code 54)
- Fully closes the ISC (Idle Speed Control) valve, and then fully opens the valve. This operation takes approximately 6 seconds.

Is the ISC operating sound heard?**YES**

→ Go to step 2.

NO

→ Go to step 7.

2. Incorrect rear wheel sensor signal.

- Check the rear wheel sensor.
- Execute the diagnostic mode. (Code 07)
- Rear wheel stop: The pulse integrated value should be constant.
- Rotate the rear wheel by hand and check that the indicated value increases.

Is check result OK?**YES**

- a. Start the engine and let it idle for approximately 10 seconds.
- b. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 6, and complete the service.

NO

→ Go to step 3.

NO

→ Go to DTC No. P1500.

3. Throttle valve does not fully close due to malfunction in throttle cables.

- Check the throttle grip free play.
Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-30.

Is check result OK?**YES**

→ Go to step 4.

NO

- a. Replace the cables.
- b. Start the engine and let it idle for approximately 10 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 4.

4. ISC (Idle Speed Control) valve is not moving correctly.

- Replace the ISC (Idle Speed Control) valve.

Refer to "Cleaning the ISC (idle speed control) valve" on page 7-11.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Replace the ISC (Idle Speed Control) unit.
- b. Start the engine and let it idle for approximately 10 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

7. Connection of ISC (Idle Speed Control) unit coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 8.

NO

- a. Connect the coupler securely or replace the sub-wire harness.
- b. Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 8.

8. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.

- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 9.

NO

- Connect the coupler securely or replace the wire harness and/or sub-wire harness.
- Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 9.

9. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 10.

NO

- Connect the coupler securely or replace the wire harness.
- Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

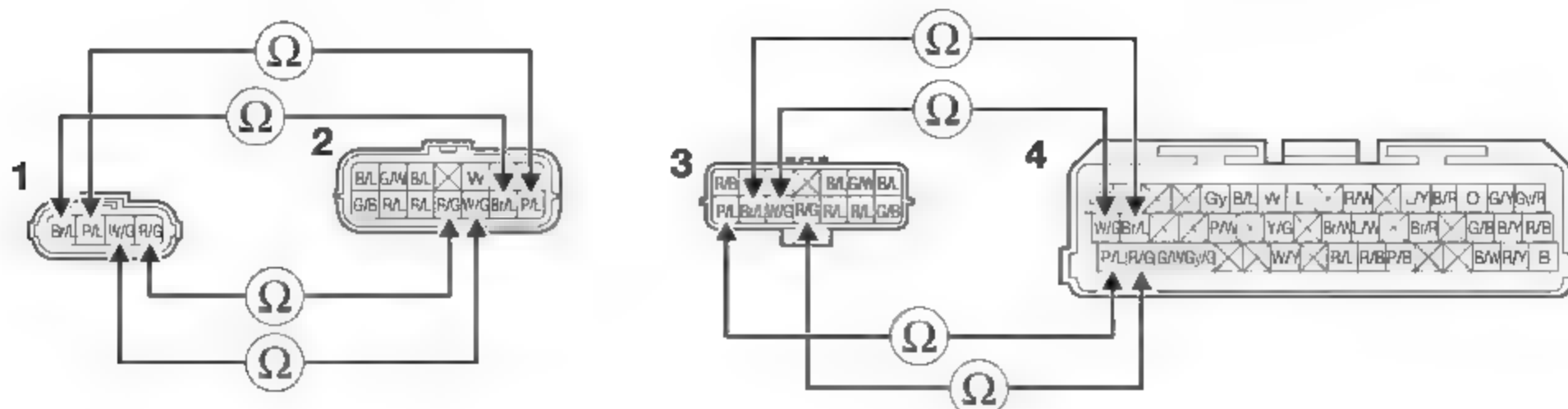
NO

→ Go to step 10.

10. Wire harness continuity.

- Disconnect the ISC (Idle Speed Control) unit coupler "1" sub-wire harness coupler (wire harness side) "2", wire harness coupler (sub-wire harness side) "3" and ECU coupler "4".
- Open circuit check

Between ISC (Idle Speed Control) unit coupler and sub-wire harness coupler (wire harness side).	red/green-red/green white/green-white/green brown/blue-brown/blue pink/blue-pink/blue
Between the wire harness coupler (sub-wire harness side) and ECU coupler.	red/green-red/green white/green-white/green brown/blue-brown/blue pink/blue-pink/blue



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- a. Replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 11.

• Short circuit check

TIP

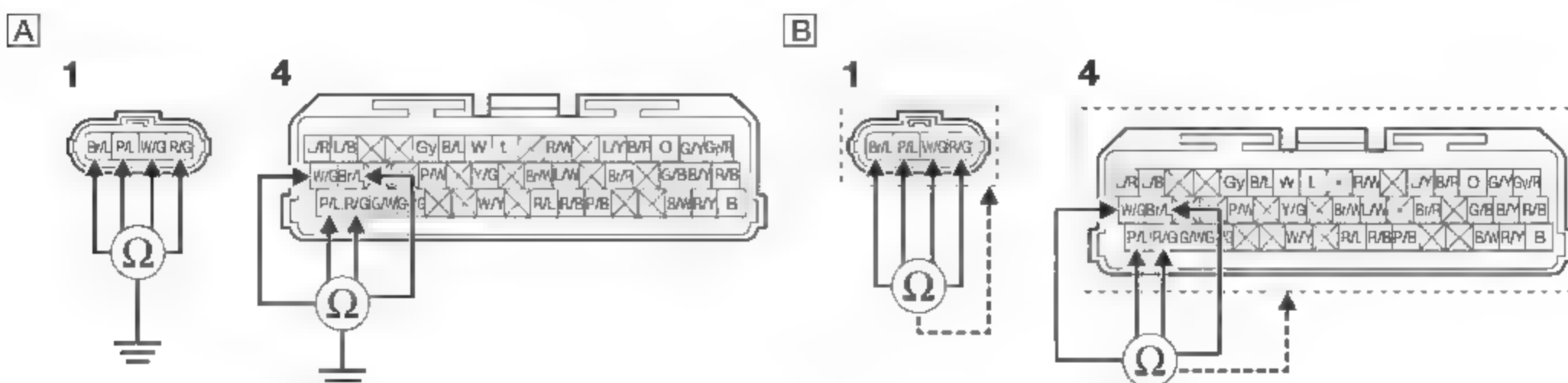
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between ISC (Idle Speed Control) unit coupler "1" and ground	red/green-ground white/green-ground brown/blue-ground pink/blue-ground
Between ECU coupler "4" and ground	red/green-ground white/green-ground brown/blue-ground pink/blue-ground

Lines short circuit check "B"

ISC (Idle Speed Control) unit coupler	red/green-any other coupler terminal white/green-any other coupler terminal brown/blue-any other coupler terminal pink/blue-any other coupler terminal
ECU coupler	red/green-any other coupler terminal white/green-any other coupler terminal brown/blue-any other coupler terminal pink/blue-any other coupler terminal



Is resistance $\infty \Omega$?

YES

→ Go to step 11.

NO

- Replace the wire harness and/or sub-wire harness.
- Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 11.

11. Installed condition of ISC (Idle Speed Control) unit.

- Improperly installed ISC (Idle Speed Control) unit.
- Check the intake air passages for air leaks.

Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-9.

Is check result OK?

YES

→ Go to step 12.

NO

- Reinstall or replace the ISC (Idle Speed Control) unit.
- Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 12.

12. ISC (Idle Speed Control) valve is not moving correctly.

- Check the ISC (Idle Speed Control) valve.

Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-9.

Is check result OK?

YES

→ Go to step 13.

NO

- Replace the ISC (Idle Speed Control) unit.
- Execute the diagnostic mode. (Code D54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 13.

13. Malfunction in ECU.

- Replace the ECU.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

14. Delete the DTC and check that the MIL goes off.

- Start the engine and let it idle for approximately 10 seconds.
- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20590

P0511

EAS33070

TROUBLESHOOTING**Item**

ISC (Idle Speed Control) valve: ISC valve does not operate.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**TIP**

Do not remove the ISC valve from the throttle body.

1. Connection of ISC unit coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- Connect the coupler securely or replace the sub-wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- Connect the coupler securely or replace the wire harness and/or sub-wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is check result OK?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 3.

3. Connection of ECU coupler.

- Check the locking condition of the coupler.

- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

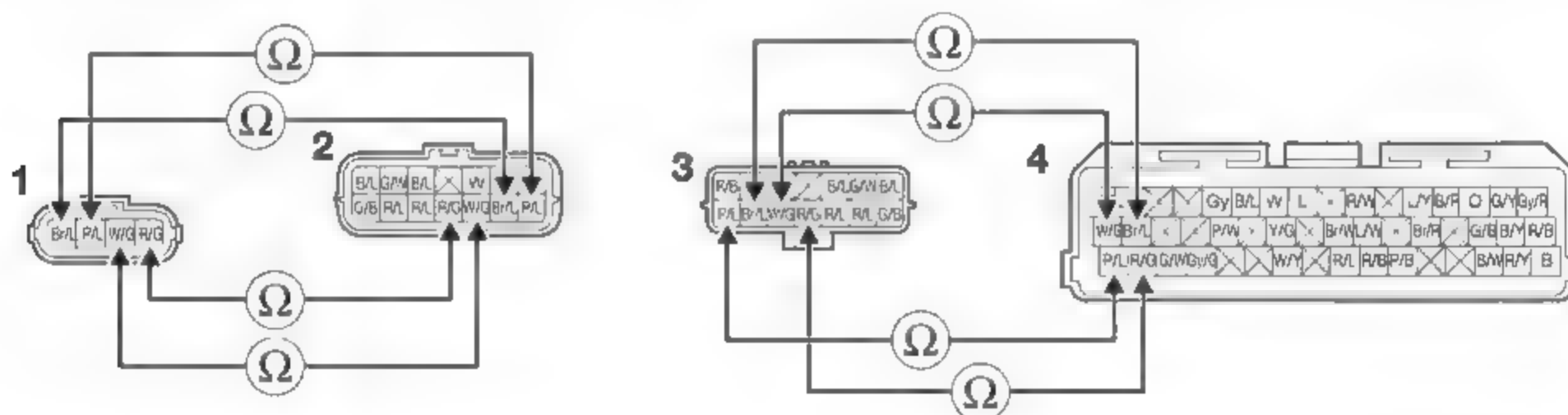
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the ISC (Idle Speed Control) unit coupler "1" sub-wire harness coupler (wire harness side) "2", wire harness coupler (sub-wire harness side) "3" and ECU coupler "4".
- Open circuit check

Between ISC (Idle Speed Control) unit coupler and sub-wire harness coupler (wire harness side).	red/green–red/green white/green–white/green brown/blue–brown/blue pink/blue–pink/blue
Between the wire harness coupler (sub-wire harness side) and ECU coupler.	red/green–red/green white/green–white/green brown/blue–brown/blue pink/blue–pink/blue



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness and/or sub-wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

- Short circuit check

TIP

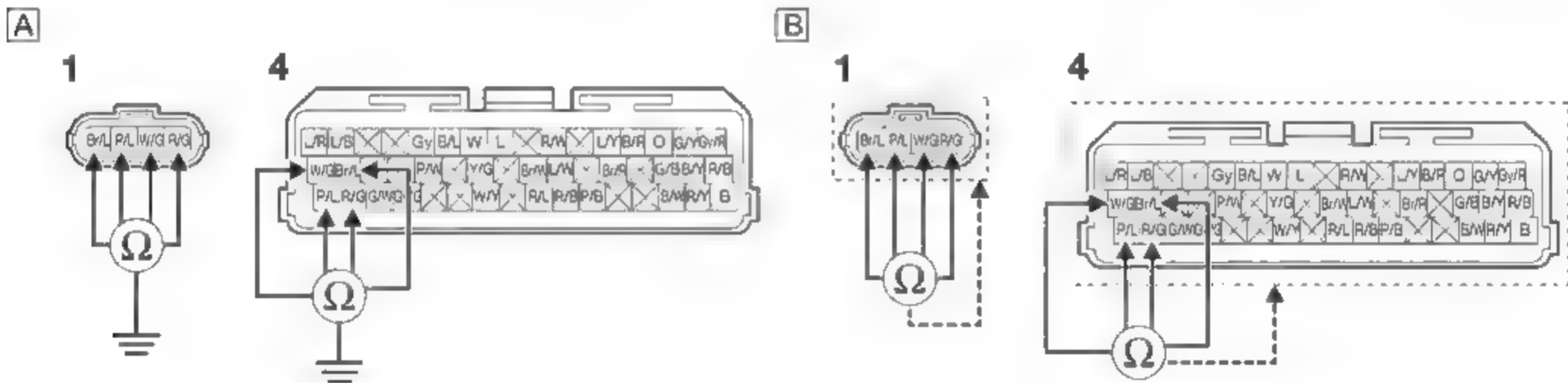
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between ISC (Idle Speed Control) unit "1" coupler and ground	red/green-ground white/green-ground brown/blue-ground pink/blue-ground
Between ECU coupler "4" and ground	red/green-ground white/green-ground brown/blue-ground pink/blue-ground

Lines short circuit check "B"

ISC (Idle Speed Control) unit coupler	red/green-any other coupler terminal white/green-any other coupler terminal brown/blue-any other coupler terminal pink/blue-any other coupler terminal
ECU coupler	red/green-any other coupler terminal white/green-any other coupler terminal brown/blue-any other coupler terminal pink/blue-any other coupler terminal



Is resistance $\infty \Omega$?

YES

→ Go to step 5.

NO

- Replace the wire harness and/or sub-wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Faulty ISC valve operation.

- Execute the diagnostic mode. (Code 54)

Is it hear operating sound?

YES

→ Go to step 6.

NO

- a. Replace the ISC valve.
Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-9.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20434

P0560, P0563

EAS33304

TROUBLESHOOTING**Item**

- [P0560] Charging voltage is abnormal.
- [P0563] Vehicle system power voltage out of range.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**TIP**

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- P0335

1. Malfunction in charging system.

- Check the charging system.

Refer to "CHARGING SYSTEM" on page 8-12.

Is check result OK?**YES**

- a. Start the engine and let it idle for approximately 5 seconds.
- b. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 2, and complete the service.

NO

→ Repeat step 1.

NO

- a. Defective rectifier/regulator or AC magneto → Replace.
- b. Defective connection in the charging system circuit → Properly connect or replace the wire harness.
- c. Start the engine and let it idle for approximately 5 seconds.
- d. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 2, and complete the service.

NO

→ Repeat step 1.

2. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20876

P0601**TROUBLESHOOTING****Item**

Internal malfunction in ECU. (When this malfunction is detected in the ECU, the DTC might not appear on the tool display.)

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure

1. Malfunction in ECU.

- Replace the ECU.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

- Turn the main switch to "ON".
- Check that the MIL does not come on.

EAS20596

P062F

EAS33076

TROUBLESHOOTING**Item**

EEPROM DTC: an error is detected while reading or writing on EEPROM.

Fail-safe system

- Able/Unable to start engine
- Able/Unable to drive vehicle

Procedure

1. Locate the malfunction.
 - Execute the diagnostic mode (Code 60)
2. Malfunction in ECU.
 - Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.
3. Delete the DTC and check that the MIL goes off.
 - Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20801

P0657

EAS33081

TROUBLESHOOTING**Item**

Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure**TIP**

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- P0335

1. Connection of relay unit coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- Connect the coupler securely or replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- Connect the coupler securely or replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

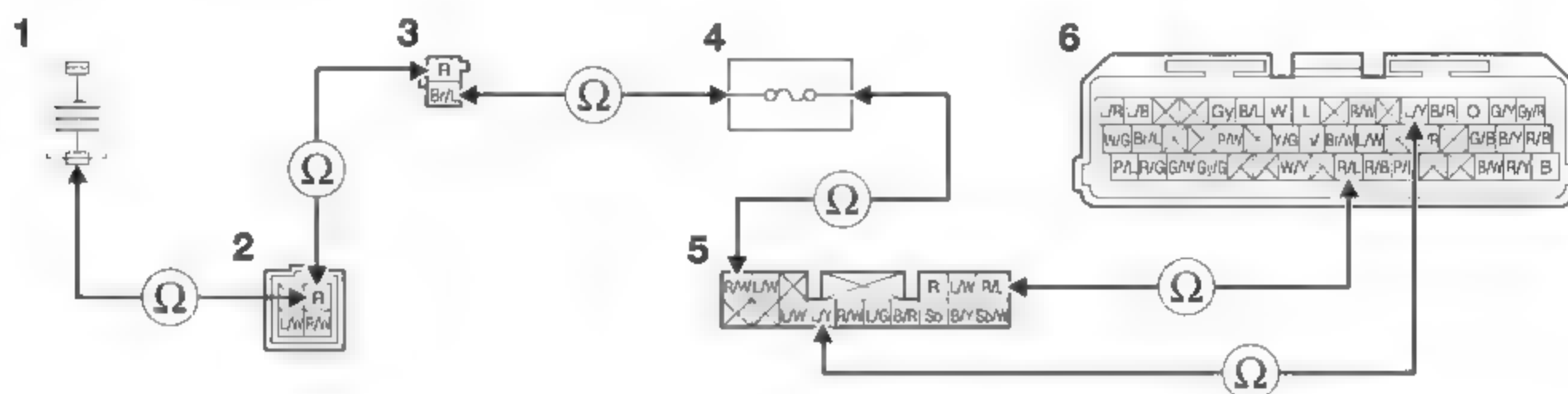
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the battery terminal "1", starter relay coupler "2", main switch coupler "3", fuel injection system fuse "4", relay unit coupler "5" and ECU coupler "6".
- Open circuit check

Between battery terminal and starter relay coupler	red-red
Between starter relay coupler and main switch coupler	red-red
Between main switch coupler and ignition fuse holder	brown/blue-brown/blue
Between ignition fuse holder and relay unit coupler	red/white-red/white
Between relay unit coupler and ECU coupler	red/blue-red/blue blue/yellow-blue/yellow



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

- Short circuit check

TIP

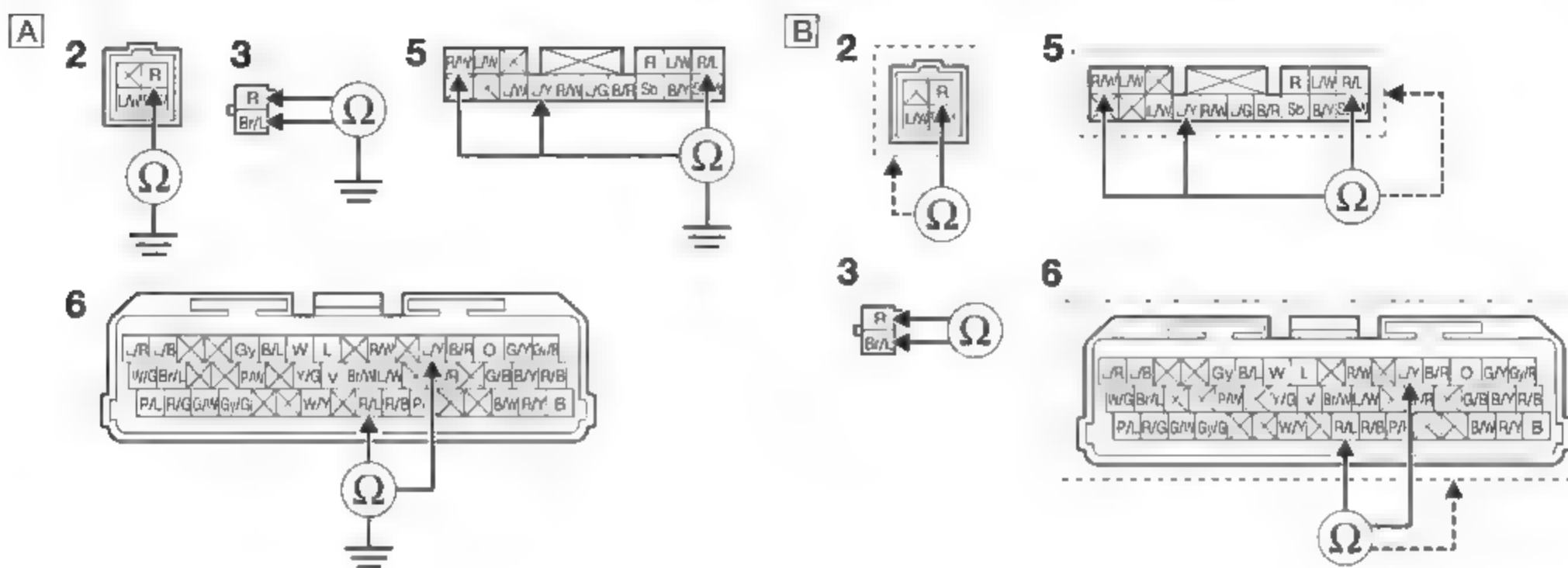
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between starter relay coupler "2" and ground.	red-ground
Between main switch coupler "3" and ground.	red-ground brown/blue-ground
Between relay unit coupler "5" and ground.	red/white-ground red/blue-ground blue/yellow-ground
Between ECU coupler "6" and ground.	red/blue-ground blue/yellow-ground

Lines short circuit check "B"

Starter relay coupler	red—any other coupler terminal
Main switch coupler	red—brown/blue
Relay unit coupler	red/white—any other coupler terminal red/blue—any other coupler terminal blue/yellow—any other coupler terminal
ECU coupler	red/blue—any other coupler terminal blue/yellow—any other coupler terminal

Is resistance $\infty \Omega$?**YES**

→ Go to step 4.

NO

- Replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Defective relay unit.

- Execute the diagnostic mode. (Code 50)
- Check the operating sound of the relay.

Is check result OK?

YES

→ Go to step 5.

NO

- Replace the relay unit.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Defective relay unit.

- Execute the diagnostic mode. (Code 09)

Is the fuel system voltage 3V or less?

YES

- a. Replace the relay unit.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20764

P1500

EAS33303

TROUBLESHOOTING**Item**

- Rear wheel sensor: no normal signals are received from the rear wheel sensor.
- Neutral switch: open or short circuit is detected.
- Clutch switch: open or short circuit is detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

1. Locate the malfunction.

- DTC P1500 detected.
 - Execute the diagnostic mode. (Code 07)
 - Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?**YES**

→ Go to step c.

NO

→ Go to step 2.

TIP

Perform the procedure from step 2 to step 7 and step 21.

- Execute the diagnostic mode. (Code 21)

When the transmission is in neutral	ON
When the transmission is in gear with the clutch lever released	OFF

Is check result OK?**YES**

→ Go to step d.

NO

→ Go to step 8.

TIP

Perform the procedure from step 8 to step 14 and step 21.

- Execute the diagnostic mode. (Code 21)

When the transmission is in gear with the clutch lever squeezed and the side-stand retracted	ON
----------------------------------------------------------------------------------------------	----

Is check result OK?**YES**

→ Go to step 21, and complete the service.

NO

→ Go to step 15.

TIP

Perform the procedure from step 15 to step 21.

2. Connection of rear wheel sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code 07)
- c. Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 3.

3. Connection of ABS ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code 07)
- c. Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 4.

4. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 5.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code 07)
- c. Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

→ Go to step 21, and complete the service.

→ Go to step 5.

- Disconnect the rear wheel sensor coupler "1", ABS ECU coupler "2" and ECU coupler "3".
- Open circuit check

YES

NO

- Replace the wire harness.
- Execute the diagnostic mode. (Code 07)
- Rotate the rear wheel by hand and check that the indicated value increases.

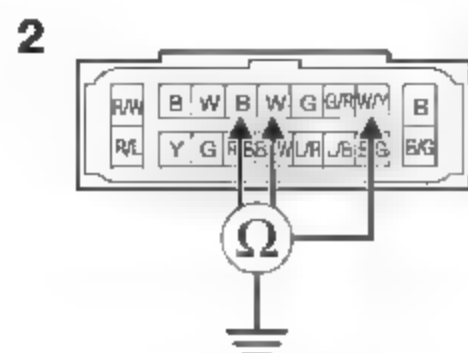
YES

NO

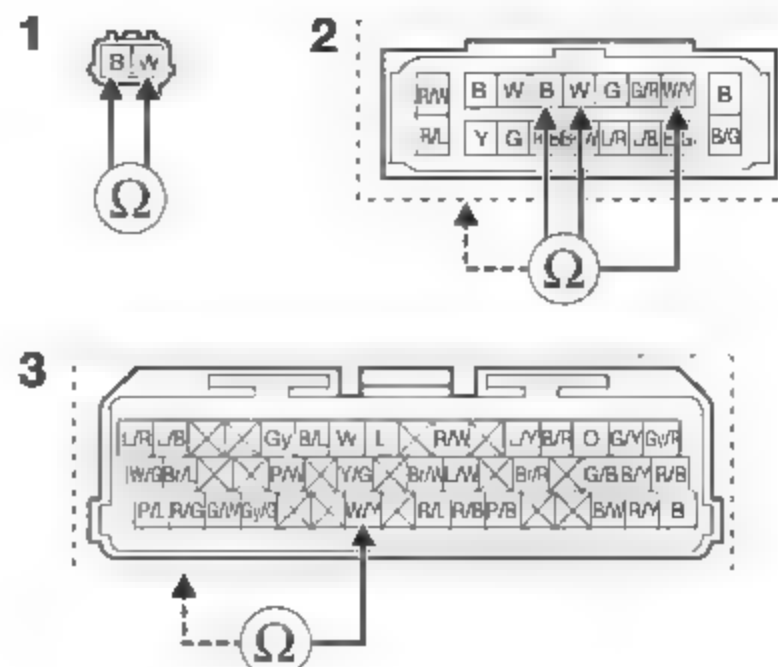
→ Go to step 6.

[illegible]

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 6.

NO

- Replace the wire harness.
- Execute the diagnostic mode. (Code 07)
- Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.
- Execute the diagnostic mode. (Code 07)
- Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 7.

7. Malfunction in ABS ECU.

- Replace the ABS ECU and go to step 21, and complete the service.

8. Connection of gear position switch coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 9.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code 21)

When the transmission is in neutral	ON
When the transmission is in gear with the clutch lever released	OFF

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 9.

9. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 10.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code 21)

When the transmission is in neutral	ON
When the transmission is in gear with the clutch lever released	OFF

Is it correct indication?

YES

→ Go to step 21, and complete the service.

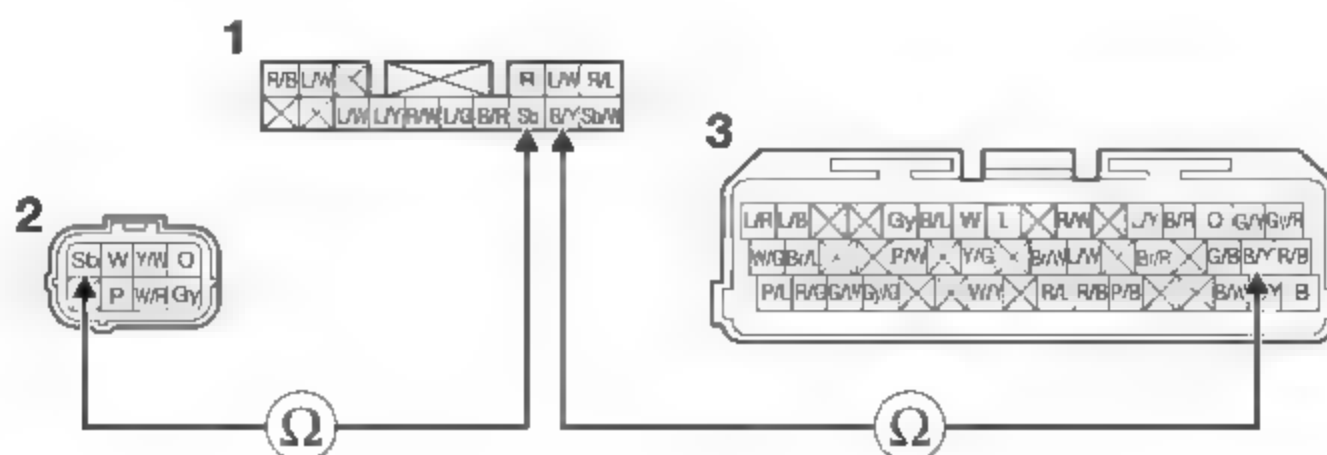
NO

→ Go to step 10.

10. Wire harness continuity.

- Disconnect the relay unit coupler "1", gear position switch coupler "2" and ECU coupler "3".
- Open circuit check

Between relay unit coupler and ECU coupler	black/yellow–black/yellow
Between relay unit coupler and gear position switch coupler	sky blue–sky blue



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

- Replace the wire harness.
- Execute the diagnostic mode. (Code 21)

When the transmission is in neutral	ON
When the transmission is in gear with the clutch lever released	OFF

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 11.

- Short circuit check

TIP

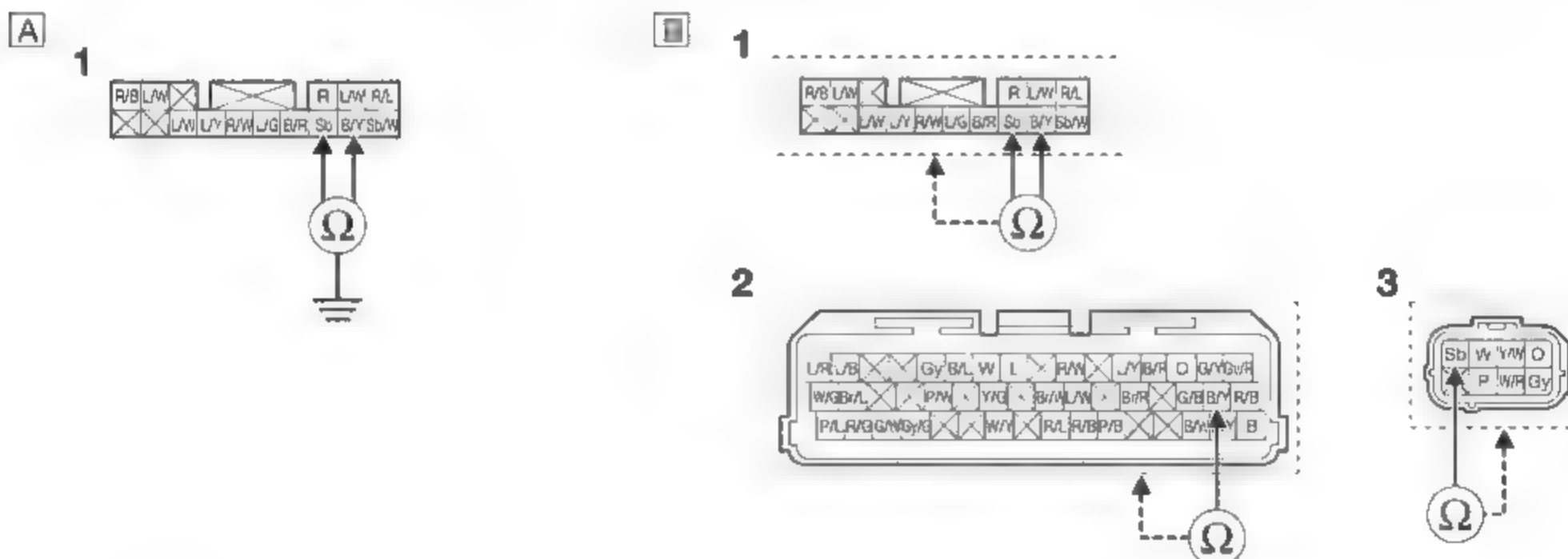
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between relay unit coupler "1" and ground	black/yellow-ground sky blue-ground
-------------------------------------------	----------------------------------------

Lines short circuit check "B"

Relay unit coupler	black/yellow-any other coupler terminal sky blue-any other coupler terminal
ECU coupler "2"	black/yellow-any other coupler terminal
Gear position switch coupler "3"	sky blue-any other coupler terminal



Is resistance $\infty \Omega$?

YES

→ Go to step 11.

NO

- Replace the wire harness.
- Execute the diagnostic mode. (Code 21)

When the transmission is in neutral	ON
When the transmission is in gear with the clutch lever released	OFF

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 11.

11. Defective relay unit (diode).

- Check the relay unit (diode).

Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-40.

Is check result OK?

YES

→ Go to step 12.

NO

- Replace the relay unit.
- Execute the diagnostic mode. (Code 21)

When the transmission is in neutral	ON
When the transmission is in gear with the clutch lever released	OFF

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 12.

12. Defective gear position switch.

- Check the gear position switch.
- Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-47.

Is check result OK?

YES

→ Go to step 13.

NO

- Replace the gear position switch.
Refer to "CRANKCASE" on page 5-70.
- Execute the diagnostic mode. (Code 21)

When the transmission is in neutral	ON
When the transmission is in gear with the clutch lever released	OFF

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 13.

13. Faulty shift drum (neutral detection area).

- Check the shift drum.

Refer to "CHECKING THE SHIFT DRUM ASSEMBLY" on page 5-95.

Is check result OK?

YES

→ Go to step 14.

NO

→ Replace the shift drum and go to step 21.

Refer to "TRANSMISSION" on page 5-91.

14. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

15. Clutch lever adjustment.

- Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-13.
- Execute the diagnostic mode. (Code 21)

When the clutch lever is released with the transmission in gear and when the sidestand is retracted	OFF
When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted	ON

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 16.

16. Connection of handlebar switch (left) coupler and clutch switch coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 17.

NO

- Connect the coupler securely or replace the left handlebar switch.
- Execute the diagnostic mode. (Code 21)

When the clutch lever is released with the transmission in gear and when the sidestand is retracted	OFF
When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted	ON

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 17.

17. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 18.

NO

- Connect the coupler securely or replace the wire harness.
- Execute the diagnostic mode. (Code 21)

When the clutch lever is released with the transmission in gear and when the sidestand is retracted	OFF
When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted	ON

Is it correct indication?**YES**

→ Go to step 21, and complete the service.

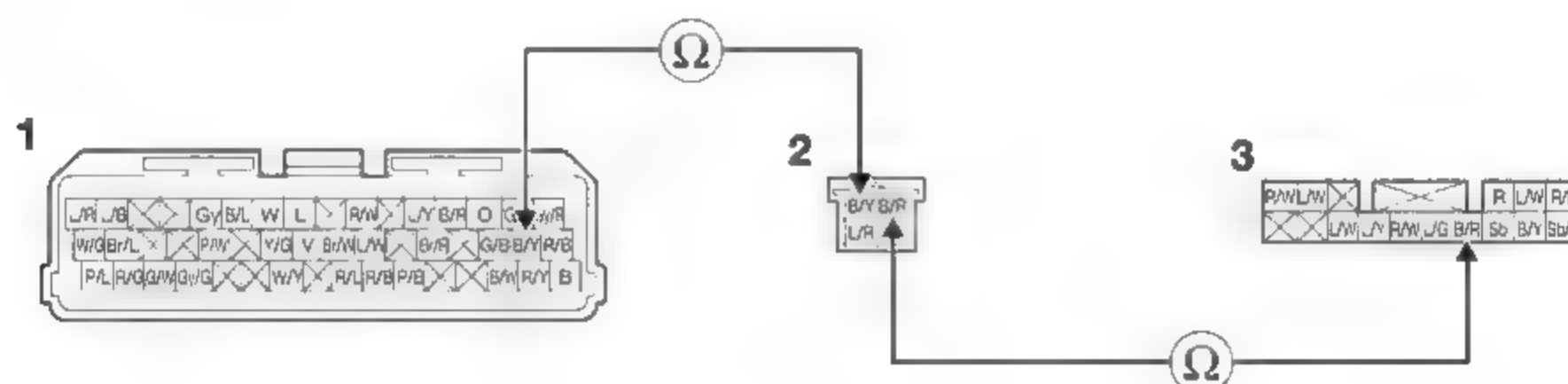
NO

→ Go to step 18.

18. Wire harness continuity.

- Disconnect the ECU coupler "1", handlebar switch (left) coupler "2" and relay unit coupler "3".
- Open circuit check

Between ECU coupler and handlebar switch (left) coupler	black/yellow–black/yellow
Between handlebar switch (left) coupler and relay unit coupler	black/red–black/red

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

- Replace the wire harness.
- Execute the diagnostic mode. (Code 21)

When the clutch lever is released with the transmission in gear and when the sidestand is retracted	OFF
When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted	ON

Is it correct indication?**YES**

→ Go to step 21, and complete the service.

NO

→ Go to step 19.

- Short circuit check

TIP

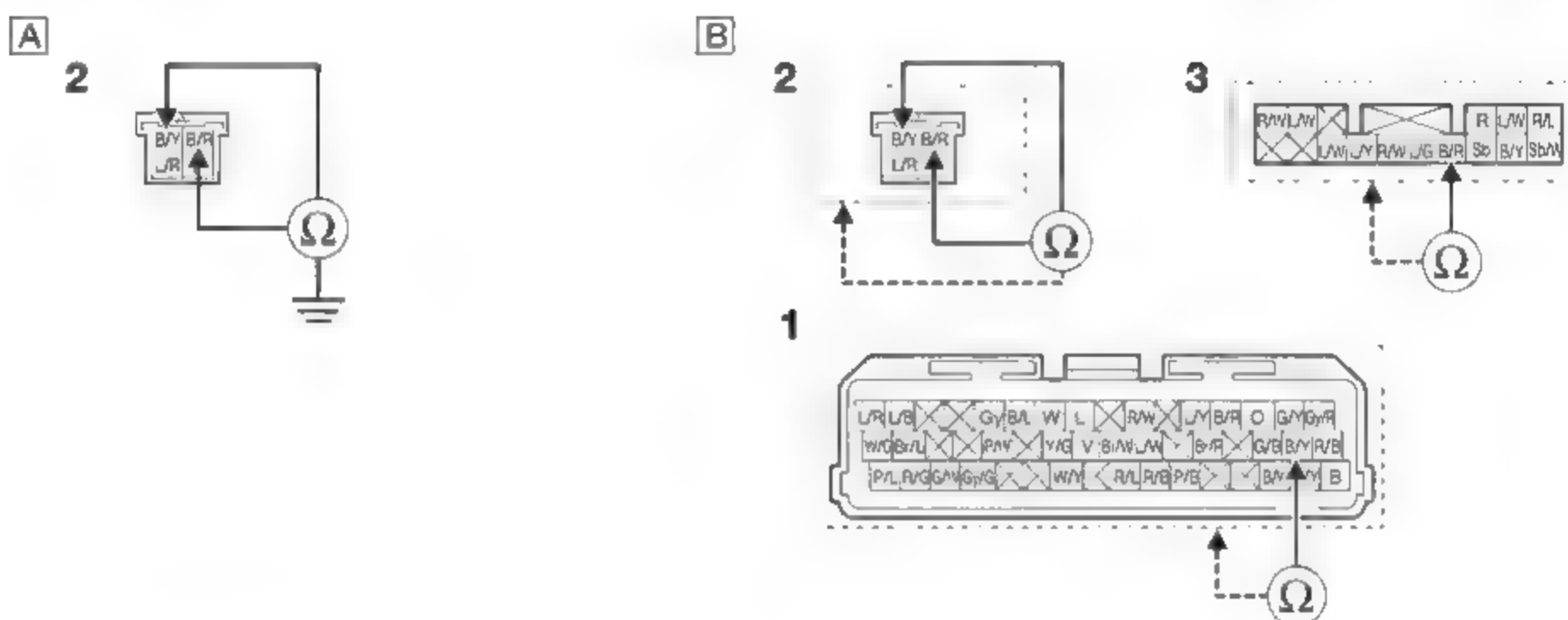
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between handlebar switch (left) coupler "2" and ground	black/yellow-ground black/red-ground
--------------------------------------------------------	-----------------------------------------

Lines short circuit check "B"

Handlebar switch (left) coupler	black/yellow-any other coupler terminal black/red-any other coupler terminal
Relay unit coupler "3"	black/red-any other coupler terminal
ECU coupler "1"	black/yellow-any other coupler terminal



Is resistance $\infty \Omega$?

YES

→ Go to step 19.

NO

- Replace the wire harness.
- Execute the diagnostic mode. (Code 21)

When the clutch lever is released with the transmission in gear and when the sidestand is retracted	OFF
When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted	ON

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 19.

19. Defective clutch switch.

- Check the clutch switch.

Refer to "CHECKING THE SWITCHES" on page 8-37.

Is check result OK?**YES**

→ Go to step 20.

NO

- a. Replace the clutch switch.
Refer to "HANDLEBAR" on page 4-57.
- b. Execute the diagnostic mode. (Code 21)

When the clutch lever is released with the transmission in gear and when the sidestand is retracted	OFF
When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted	ON

Is it correct indication?**YES**

→ Go to step 21, and complete the service.

NO

→ Go to step 20.

20. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

21. Delete the DTC and check that the MIL goes off.

- Turn the main switch to "ON", and then rotate the rear wheel by hand.
- Start the engine, and run the vehicle at 20 to 30 km/h (12 to 19 mph).
- Confirm that the DTC has a condition of "Recovered" using the malfunction mode of the YDT, and then delete the DTC. Delete this DTC even if it has a condition of "Detected".

EAS20814

P1601

EAS33094

TROUBLESHOOTING**Item**

Sidestand switch: open or short circuit of the black/red lead of the ECU is detected.

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure**1. Connection of sidestand switch coupler.**

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then extend and retract the sidestand.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then extend and retract the sidestand.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 3.

3. Connection of relay unit coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 4.

NO

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then extend and retract the sidestand.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

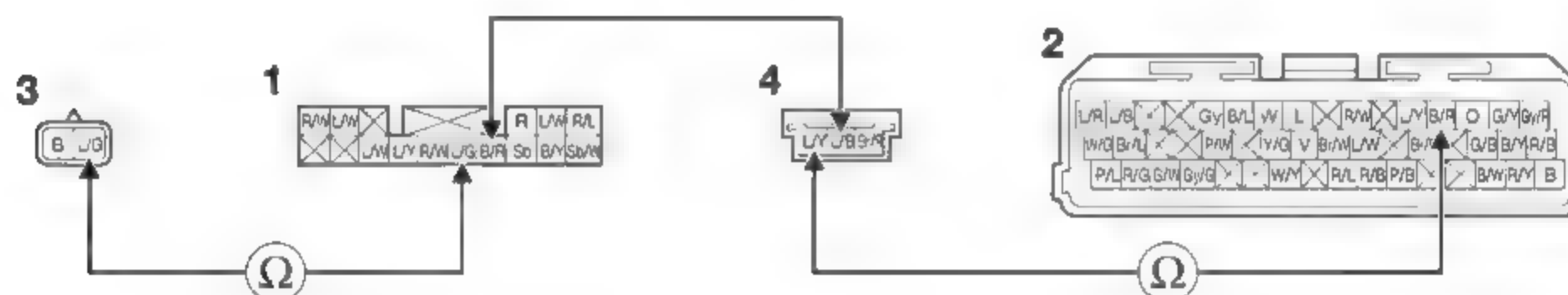
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the relay unit coupler "1", ECU coupler "2", sidestand switch coupler "3" and main switch coupler "4".
- Open circuit check

Between relay unit coupler and main switch coupler	black/red–blue/black
Between main switch coupler and ECU coupler	blue/yellow–black/red
Between relay unit coupler and sidestand switch coupler	blue/green–blue/green

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then extend and retract the sidestand.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?**YES**

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

- Short circuit check

TIP

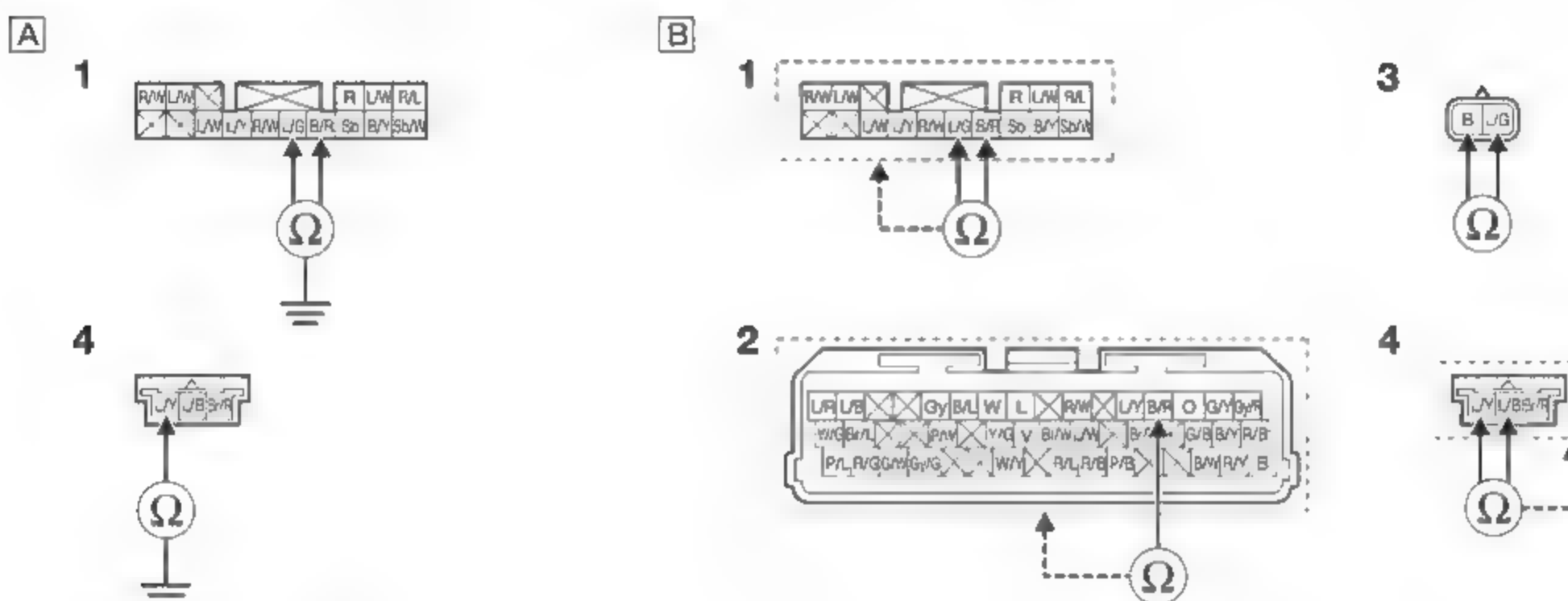
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between relay unit coupler "1" and ground	black/red-ground blue/green-ground
Between main switch coupler "4" and ground	blue/yellow-ground

Lines short circuit check "B"

Relay unit coupler	black/red-any other coupler terminal blue/green-any other coupler terminal
ECU coupler "2"	black/red-any other coupler terminal
Sidestand switch coupler "3"	blue/green-black
Main switch coupler	blue/yellow-any other coupler terminal blue/black-any other coupler terminal

Is resistance $\infty \Omega$?**YES**

→ Go to step 5.

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then extend and retract the sidestand.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Defective sidestand switch.

- Execute the diagnostic mode. (Code 20)
- Shift the transmission into gear.

Sidestand retracted	ON
Sidestand extended	OFF

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the sidestand switch.
- b. Turn the main switch to "ON", and then extend and retract the sidestand.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20815

P1602**TROUBLESHOOTING****Item**

Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).

Fail-safe system

- Able/Unable to start engine
- Able/Unable to drive vehicle

Procedure

1. Installed condition of battery leads.

- Check the installed condition of the battery and battery leads (loose bolts).

Is check result OK?

YES

→ Go to step 2.

NO

- a. Reinstall or replace the battery leads.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 2.

2. Connection of starter relay coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 3.

3. Connection of main switch coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Check the fuel injection system fuse.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Replace the fuse.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

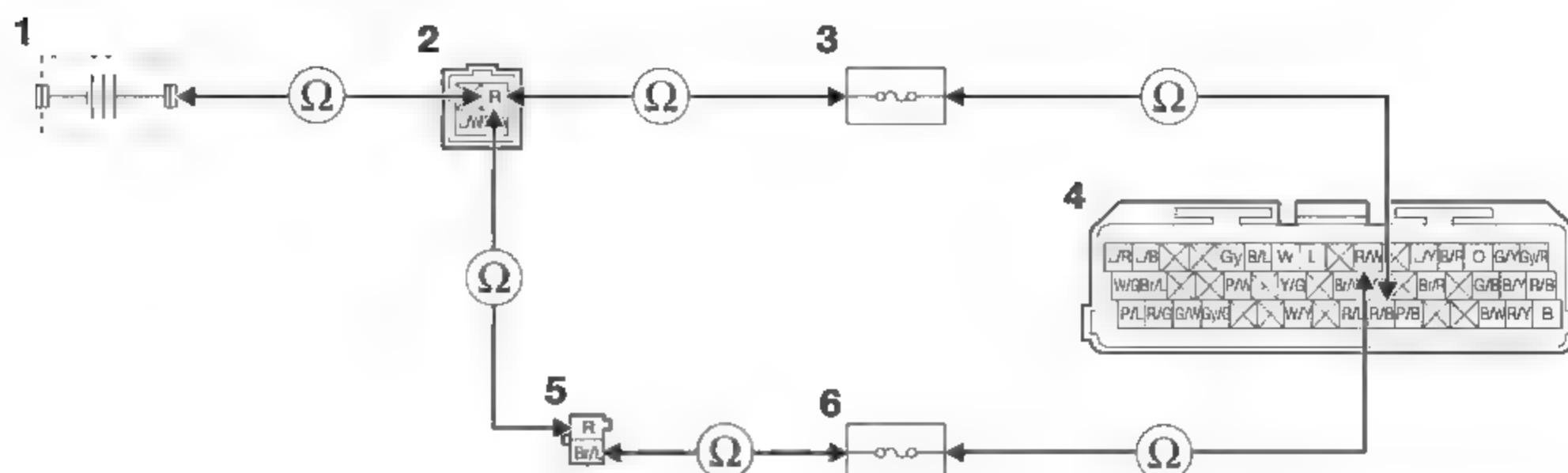
NO

→ Go to step 5.

5. Wire harness continuity.

- Disconnect the battery "1", starter relay coupler (main fuse) "2", fuel injection system fuse "3", ECU coupler "4", main switch coupler "5" and ignition fuse "6".
- Open circuit check

Between battery and starter relay coupler	red-red
Between starter relay coupler and fuel injection system fuse holder	red-red
Between starter relay coupler and main switch coupler	red-red
Between fuel injection system fuse holder and ECU coupler	red/black-red/black
Between main switch coupler and ignition fuse holder	brown/blue-brown/blue
Between ignition fuse holder and ECU coupler	red/white-red/white



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

a. Replace the wire harness.

b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

• Short circuit check

TIP

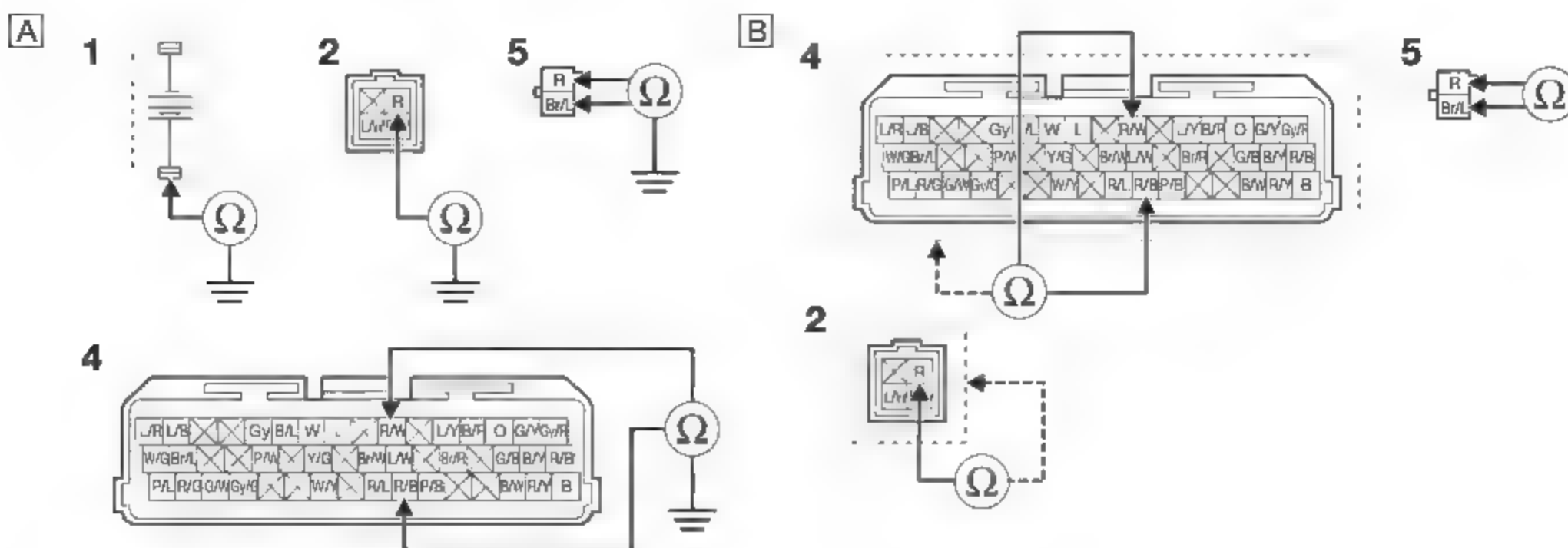
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between battery "1" and ground	red-ground
Between starter relay coupler (main fuse) "2" and ground	red-ground
Between ECU coupler "4" and ground	red/black-ground red/white-ground
Between main switch coupler "5" and ground	red-ground brown/blue-ground

Lines short circuit check "B"

ECU coupler	red/black-any other coupler terminal red/white-any other coupler terminal
Main switch coupler	brown/blue-red
Starter relay coupler	red-any other coupler terminal



Is resistance $\infty \Omega$?

YES

→ Go to step 6.

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20817

P1604, P1605

EAS33097

TROUBLESHOOTING

Item

- [P1604] Lean angle sensor: ground short circuit detected.
- [P1605] Lean angle sensor: open or power short circuit detected.

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure

1. Connection of lean angle sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", then to "OFF", and back to "ON".
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 2.

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", then to "OFF", and back to "ON".
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

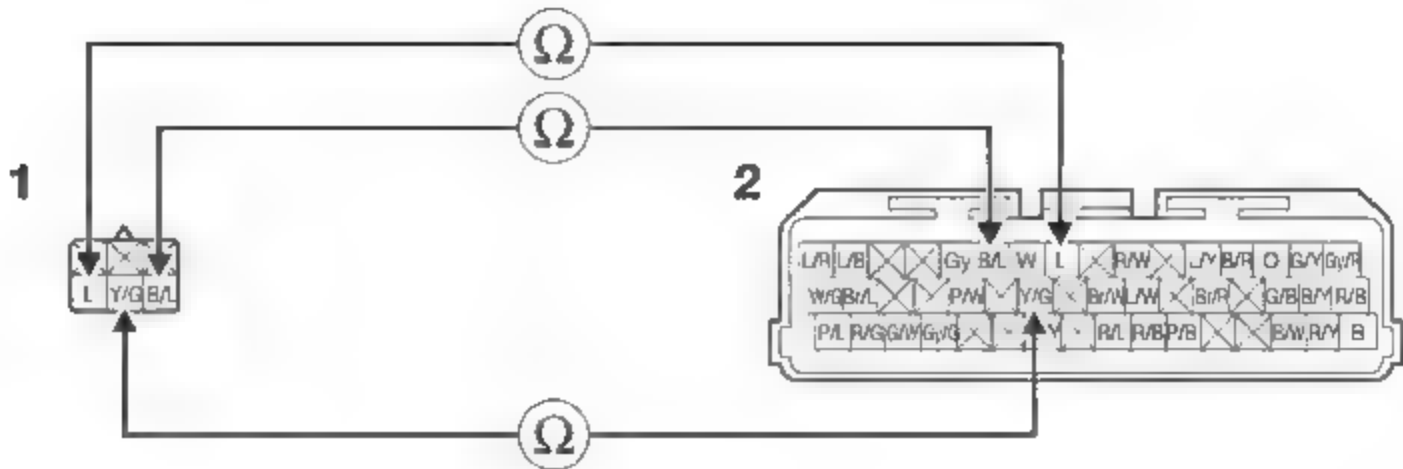
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the lean angle sensor coupler "1" and ECU coupler "2".
- Open circuit check

Between ECU coupler and lean angle sensor coupler	blue–blue yellow/green–yellow/green black/blue–black/blue
---------------------------------------------------	-----------------------------------------------------------------



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, then to “OFF”, and back to “ON”.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 4.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

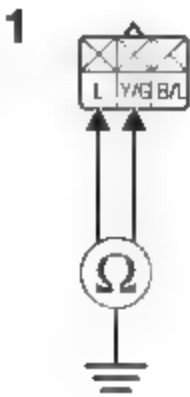
Ground short circuit check “A”

Between lean angle sensor coupler “1” and ground	blue–ground yellow/green–ground
--------------------------------------------------	------------------------------------

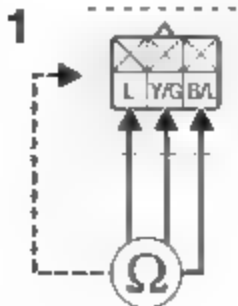
Lines short circuit check “B”

Lean angle sensor coupler	blue–any other coupler terminal yellow/green–any other coupler terminal black/blue–any other coupler terminal
ECU coupler “2”	blue–any other coupler terminal yellow/green–any other coupler terminal black/blue–any other coupler terminal

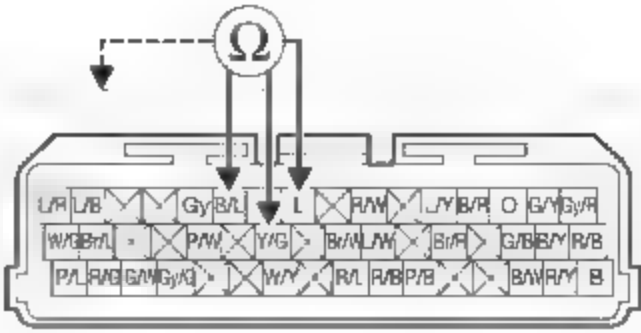
A



B



2



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

- a. Replace the wire harness.
- b. Turn the main switch to "ON", then to "OFF", and back to "ON".
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 4.

4. Defective lean angle sensor.

- Measure the output voltage of lean angle sensor.

Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-43.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Replace the lean angle sensor.
- b. Turn the main switch to "ON", then to "OFF", and back to "ON".
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20849

U0155 or Err

EAS33129

TROUBLESHOOTING

Item

Multi-function meter: signals cannot be transmitted between the ECU and the multi-function meter.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

TIP

“Err” is displayed on the multi-function meter, but the MIL does not come on.

1. Connection of meter assembly coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 2.

2. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 6, and complete the service.

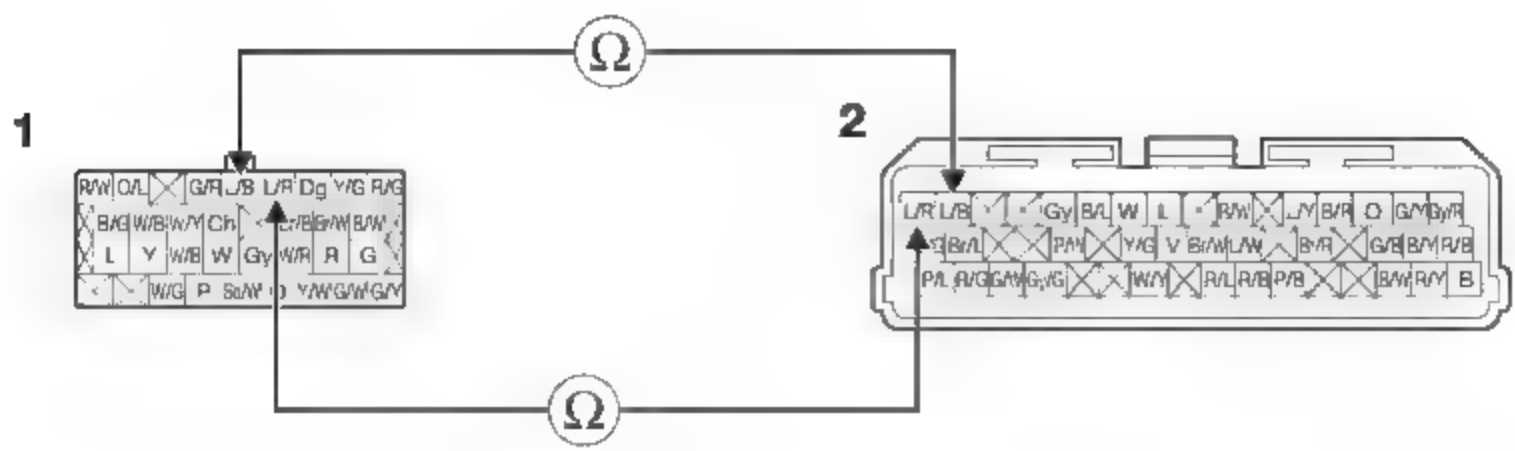
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the meter assembly coupler “1” and ECU coupler “2”.
- Open circuit check

Between meter assembly coupler and ECU coupler	blue/red–blue/red blue/black–blue/black
------------------------------------------------	--------------------------------------------



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 4.

• Short circuit check

TIP

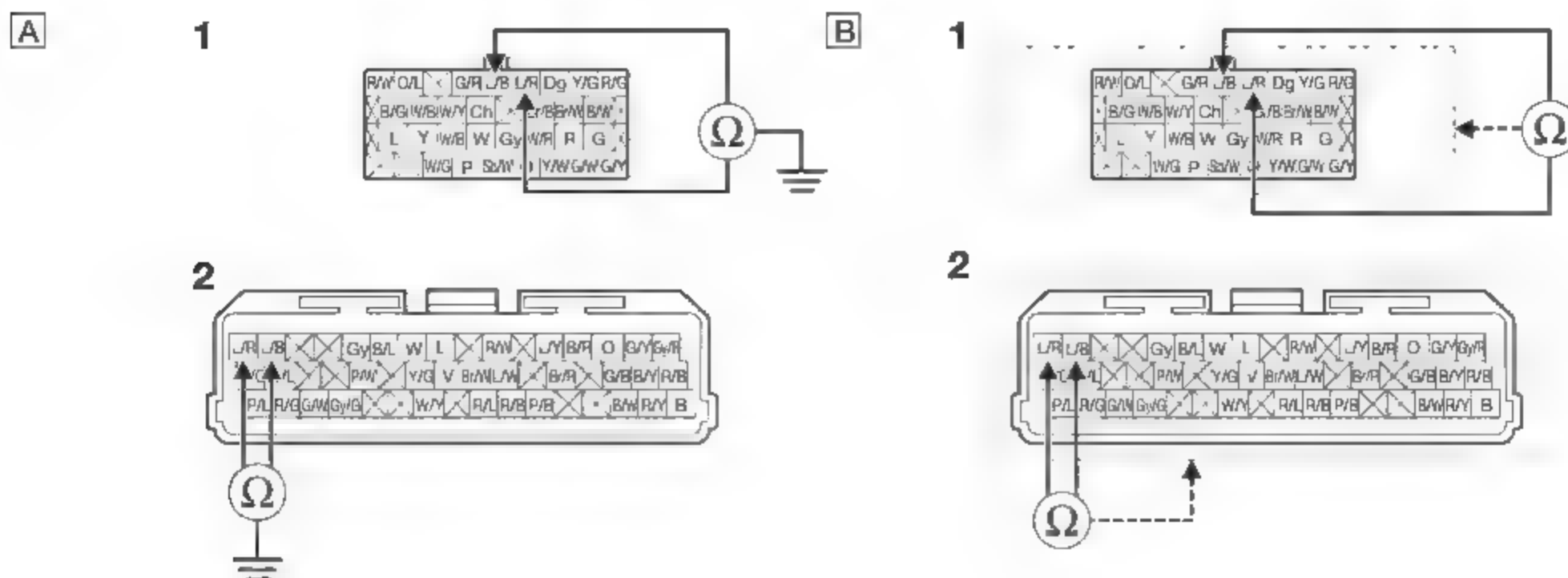
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between meter assembly coupler “1” and ground	blue/red–ground blue/black–ground
Between ECU coupler “2” and ground	blue/red–ground blue/black–ground

Lines short circuit check “B”

Meter assembly coupler	blue/red–any other coupler terminal blue/black–any other coupler terminal
ECU coupler	blue/red–any other coupler terminal blue/black–any other coupler terminal



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 4.

4. Defective meter assembly.

- Replace the meter assembly.

Refer to "GENERAL CHASSIS (4)" on page 4-8.

- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 6, and complete the service.

NO

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20785

11, 25_ABS

EAS33314

TROUBLESHOOTING**Item**

Front wheel sensor (intermittent pulses or no pulses)

Procedure**TIP**

With the front wheel stopped, the rear wheel was rotated for longer than about 20 seconds (DTC No. 11) or for longer than about 2 seconds (DTC No. 25).

1. Foreign material adhered around the front wheel sensor.

- Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the front wheel.

- Check the components for looseness, distortion, and bends.
Refer to "CHECKING THE FRONT WHEEL" on page 4-13.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Replace the wheel axle, tire, front wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

Is check result OK?**YES**

→ Go to step 4.

NO

→ Replace the sensor rotor.

4. Defective front wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

Is check result OK?**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Replace the wheel sensor.

EAS20686

12_ABS

EAS33315

TROUBLESHOOTING**Item**

Rear wheel sensor (intermittent pulses or no pulses)

Procedure

1. Foreign material adhered around the rear wheel sensor.

- Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the rear wheel.

- Check the components for looseness, distortion, and bends.

Refer to "CHECKING THE REAR WHEEL" on page 4-21.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Replace the wheel axle, tire, rear wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-22.

Is check result OK?**YES**

→ Go to step 4.

NO

→ Replace the sensor rotor.

4. Defective rear wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-22.

Is check result OK?**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Replace the wheel sensor.

EAS20687

13, 26_ABS

EAS33316

TROUBLESHOOTING**Item**

Front wheel sensor (abnormal pulse period)

Procedure**TIP**

- If the front brake ABS operates continuously for 20 seconds or more, DTC No. 26 will be recorded.
If the front brake ABS operates continuously for 36 seconds or more, DTC No. 13 will be recorded.
- Vehicle possibly ridden on uneven roads.

1. Foreign material adhered around the front wheel sensor.

- Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the front wheel.

- Check the components for looseness, distortion, and bends.
Refer to "CHECKING THE FRONT WHEEL" on page 4-13.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Replace the wheel axle, tire, front wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

Is check result OK?**YES**

→ Go to step 4.

NO

→ Replace the sensor rotor.

4. Defective front wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

Is check result OK?**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Replace the wheel sensor.

EAS20688

14, 27_ABS

EAS33317

TROUBLESHOOTING**Item**

Rear wheel sensor (abnormal pulse period)

Procedure**TIP**

- If the rear brake ABS operates continuously for 20 seconds or more, DTC No. 27 will be recorded. If the rear brake ABS operates continuously for 36 seconds or more, DTC No. 14 will be recorded.
- Vehicle possibly ridden on uneven roads.

1. Foreign material adhered around the rear wheel sensor.

- Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the rear wheel.

- Check the components for looseness, distortion, and bends.
Refer to "CHECKING THE REAR WHEEL" on page 4-21.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Replace the wheel axle, tire, rear wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.
Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-22.

Is check result OK?**YES**

→ Go to step 4.

NO

→ Replace the sensor rotor.

4. Defective rear wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.
Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-22.

Is check result OK?**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Replace the wheel sensor.

EAS20662

15_ABS

EAS3040

TROUBLESHOOTING**Item**

Front wheel sensor (open or short circuit)

Procedure

1. Defective coupler between the front wheel sensor and the hydraulic unit assembly.

- Check the coupler for any pins that may be pulled out.
- Check the locking condition of the coupler.

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Is check result OK?**YES**

→ Go to step 2.

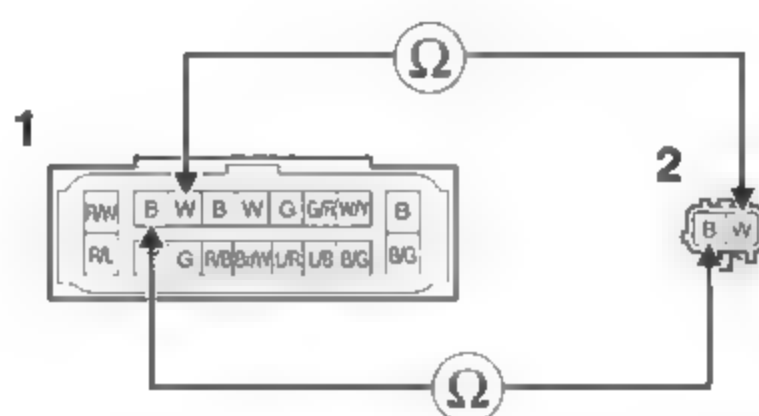
NO

→ Connect the coupler securely or replace the wire harness.

2. Wire harness continuity.

- Disconnect the ABS ECU coupler "1" and front wheel sensor coupler "2".
- Open circuit check

Between ABS ECU coupler and front wheel sensor coupler	white—white black—black
--------------------------------------------------------	----------------------------

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

Ground short circuit check "A"

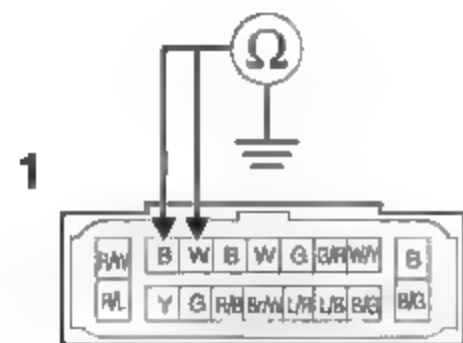
Between ABS ECU coupler "1" and ground	white—ground black—ground
----------------------------------------	------------------------------

Lines short circuit check "B"

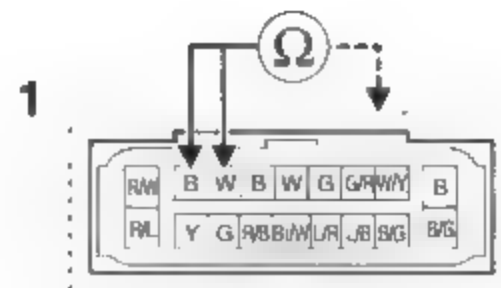
ABS ECU coupler

white—any other coupler terminal
black—any other coupler terminal

A



B

Is resistance $\infty \Omega$?**YES**

→ Go to step 3.

NO

→ Replace the wire harness.

3. Defective front wheel sensor or hydraulic unit assembly.

- If the above items were performed and no malfunctions were found, the wheel sensor or hydraulic unit assembly is defective.
 - Replace the wheel sensor or hydraulic unit assembly.
- Refer to "FRONT WHEEL" on page 4-11 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

EAS20663

16_ABS

EAS33265

TROUBLESHOOTING**Item**

Rear wheel sensor (open or short circuit)

Procedure

1. Defective coupler between the rear wheel sensor and the hydraulic unit assembly.

- Check the coupler for any pins that may be pulled out.
- Check the locking condition of the coupler.

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Is check result OK?**YES**

→ Go to step 2.

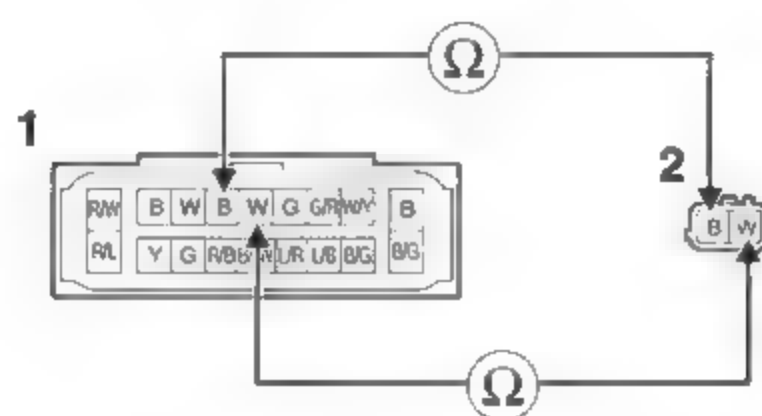
NO

→ Connect the coupler securely or replace the wire harness.

2. Wire harness continuity.

- Disconnect the ABS ECU coupler "1" and rear wheel sensor coupler "2".
- Open circuit check

Between ABS ECU coupler and rear wheel sensor coupler	white—white black—black
-------------------------------------------------------	----------------------------

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

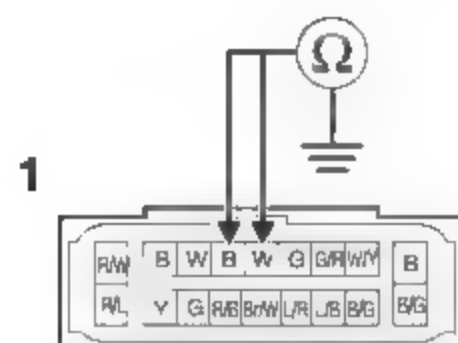
Ground short circuit check "A"

Between ABS ECU coupler "1" and ground	white—ground black—ground
----------------------------------------	------------------------------

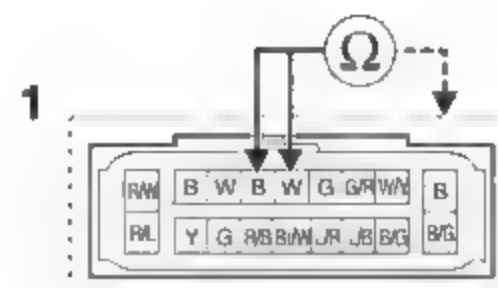
Lines short circuit check "B"

ABS ECU coupler	white—any other coupler terminal black—any other coupler terminal
-----------------	----------------------------------------------------------------------

A



B

Is resistance $\infty \Omega$?**YES**

→ Go to step 3.

NO

→ Replace the wire harness.

3. Defective rear wheel sensor or hydraulic unit assembly.

- If the above items were performed and no malfunctions were found, the wheel sensor or hydraulic unit assembly is defective.
 - Replace the wheel sensor or hydraulic unit assembly.
- Refer to "REAR WHEEL" on page 4-18 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

EAS20708

17, 45_ABS

EAS3330

TROUBLESHOOTING**Item**

Front wheel sensor (missing pulses)

Procedure**TIP**

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mi/h) or more, DTC No. 17 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mi/h) or less, DTC No. 45 will be recorded first and DTC No. 17 will be recorded if the condition continues.

1. Foreign material adhered around the front wheel sensor.

- Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the front wheel.

- Check the components for looseness, distortion, and bends.
Refer to "CHECKING THE FRONT WHEEL" on page 4-13.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Replace the wheel axle, tire, front wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

Is check result OK?**YES**

→ Go to step 4.

NO

→ Replace the sensor rotor.

4. Defective front wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

Is check result OK?**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Replace the wheel sensor.

EAS20709

18, 46_ABS

EAS33325

TROUBLESHOOTING**Item**

Rear wheel sensor (missing pulses)

Procedure**TIP**

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mi/h) or more, DTC No. 18 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mi/h) or less, DTC No. 46 will be recorded first and DTC No. 18 will be recorded if the condition continues.

1. Foreign material adhered around the rear wheel sensor.

- Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the rear wheel.

- Check the components for looseness, distortion, and bends.
Refer to "CHECKING THE REAR WHEEL" on page 4-21.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Replace the wheel axle, tire, rear wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.
Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-22.

Is check result OK?**YES**

→ Go to step 4.

NO

→ Replace the sensor rotor.

4. Defective rear wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.
Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-22.

Is check result OK?**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Replace the wheel sensor.

EAS20890

21_ABS

EAS33320

TROUBLESHOOTING

Item

Hydraulic unit assembly (defective solenoid drive circuit)

Procedure

1. Defective hydraulic unit assembly.
 - Replace the hydraulic unit assembly.
Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-49.

EAS20710

24_ABS

EAS3374

TROUBLESHOOTING**Item**

Brake light switch or tail/brake light

Procedure

1. Defective signaling system. (tail/brake light or brake light switch)

- Check the brake light switches.

Refer to "CHECKING THE SWITCHES" on page 8-37.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Repair or replace the defective part.

2. Defective coupler between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly.

- Check the coupler for any pins that may be pulled out.
- Check the locking condition of the coupler.

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Is check result OK?**YES**

→ Go to step 3.

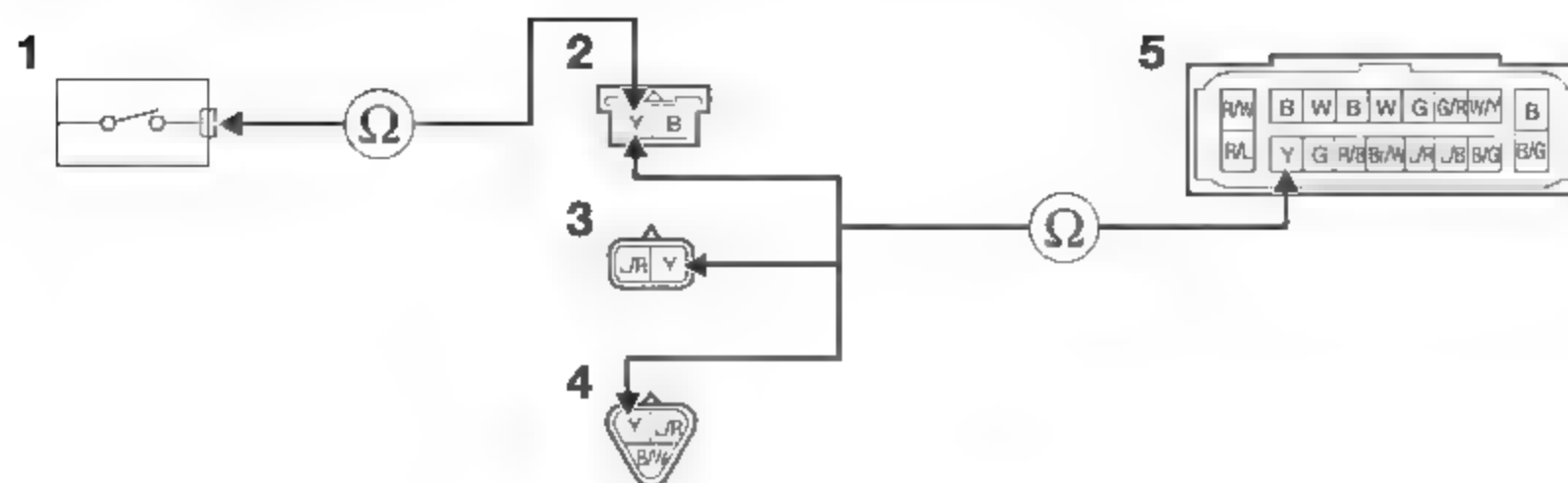
NO

→ Connect the coupler securely or replace the wire harness.

3. Wire harness continuity.

- Disconnect the front brake light switch connector "1" right handlebar switch coupler "2", rear brake light switch coupler "3", tail/brake light assembly coupler "4", and ABS ECU coupler "5".
- Open circuit check

Between front brake light switch connector and right handlebar switch coupler	yellow–yellow
Between right handlebar switch coupler and ABS ECU coupler	yellow–yellow
Between rear brake light switch coupler and ABS ECU coupler	yellow–yellow
Between tail/brake light assembly coupler and ABS ECU coupler	yellow–yellow



Is resistance 0 Ω ?

YES

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

Ground short circuit check "A"

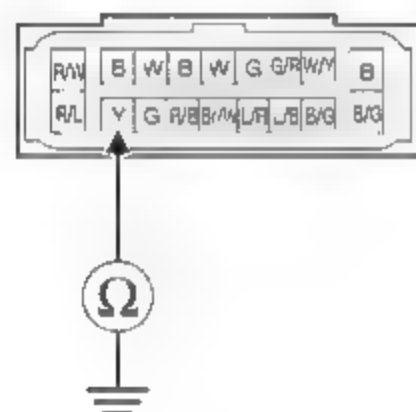
Between ABS ECU coupler "5" and ground	yellow-ground
----------------------------------------	---------------

Lines short circuit check "B"

Right handlebar switch coupler "2"	yellow-any other coupler terminal
Rear brake light switch coupler "3"	yellow-blue/red
Tail/brake light assembly coupler "4"	yellow-any other coupler terminal
ABS ECU coupler	yellow-any other coupler terminal

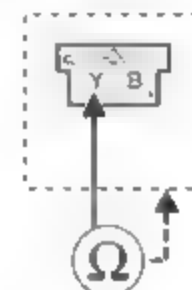
A

5



B

2



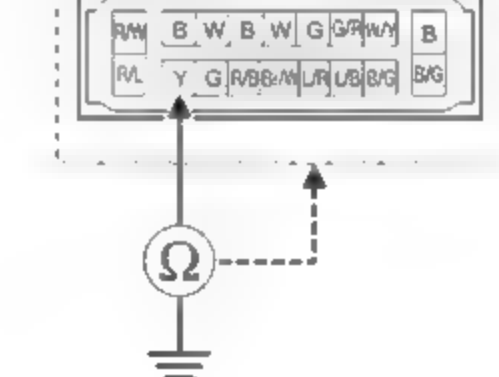
3



4



5



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

→ Replace the wire harness.

- Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

EAS20891

31_ABS

EAS33321

TROUBLESHOOTING

Hydraulic unit assembly (defective ABS solenoid power circuit)

Procedure

1. Blown ABS solenoid fuse.

- Check the ABS solenoid fuse.

Refer to "CHECKING THE FUSES" on page 8-38.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Replace the fuse and check the wire harness.

2. Defective coupler between the battery and the hydraulic unit assembly.

- Check the coupler for any pins that may be pulled out.
- Check the locking condition of the coupler.

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Connect the coupler securely or replace the wire harness.

3. Wire harness continuity.

- Disconnect the ABS solenoid fuse "1" and ABS ECU coupler "2".
- Open circuit check

Between ABS solenoid fuse holder and ABS ECU coupler

red/white-red/white

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

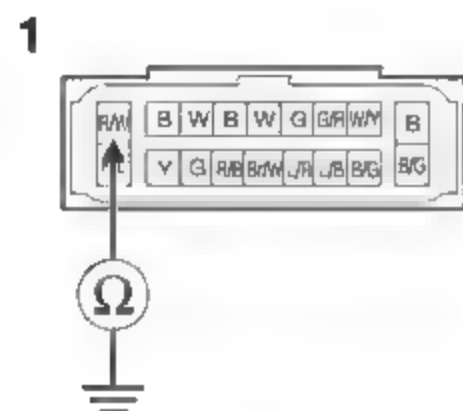
Ground short circuit check "A"

Between ABS ECU coupler "1" and ground	red/white-ground
----------------------------------------	------------------

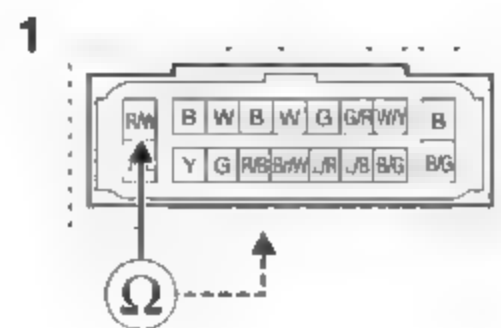
Lines short circuit check "B"

ABS ECU coupler	red/white-any other coupler terminal
-----------------	--------------------------------------

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

→ Replace the wire harness.

4. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

EAS20712

32_ABS

EAS33376

TROUBLESHOOTING**Item**

Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)

Procedure

1. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-49.

EAS20882

33_ABS

EAS33322

TROUBLESHOOTING**Item**

Hydraulic unit assembly (abnormal ABS motor power supply)

Procedure

1. Blown ABS motor fuse.

- Check the ABS motor fuse.

Refer to "CHECKING THE FUSES" on page 8-38.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Replace the fuse and check the wire harness.

2. Defective coupler between the battery and the hydraulic unit assembly.

- Check the coupler for any pins that may be pulled out.
- Check the locking condition of the coupler.

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Connect the coupler securely or replace the wire harness.

3. Wire harness continuity.

- Disconnect the ABS motor fuse "1" and ABS ECU coupler "2".
- Open circuit check

Between ABS motor fuse holder and ABS ECU coupler

red/blue-red/blue

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

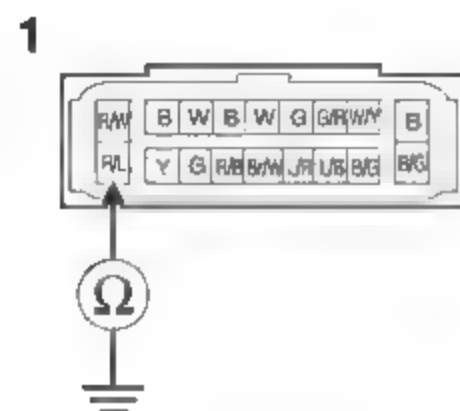
Ground short circuit check "A"

Between ABS ECU coupler "1" and ground	red/blue-ground
----------------------------------------	-----------------

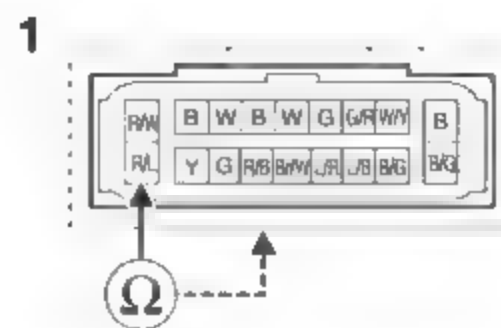
Lines short circuit check "B"

ABS ECU coupler	red/blue-any other coupler terminal
-----------------	-------------------------------------

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

NO

→ Replace the wire harness.

4. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

EAS20883

34_ABS

EAS33323

TROUBLESHOOTING**Item**

Hydraulic unit assembly (short circuit in ABS motor power supply circuit)

Procedure

1. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

EAS20884

41_ABS

EAS33331

TROUBLESHOOTING**Item**

Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)

Procedure

1. Incorrect installation of the front wheel sensor.

- Check the components for looseness, distortion, and bends.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

Is check result OK?

YES

→ Go to step 2.

NO

→ Repair or replace the defective part.

2. Incorrect rotation of the front wheel.

- Check that there is no brake disc drag on the wheel and make sure that it rotates smoothly.

Refer to "CHECKING THE FRONT WHEEL" on page 4-13 and "CHECKING THE FRONT BRAKE DISCS" on page 4-31.

Is check result OK?

YES

→ Go to step 3.

NO

→ Repair or replace the defective part.

3. Front brake dragging.

- Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake lever is operated and that the pressure decreases when the lever is released.

Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-31.

Is check result OK?

YES

→ Go to step 4.

NO

→ Repair or replace the defective part.

4. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

42, 47_ABS

EAS33324

TROUBLESHOOTING**Item**

Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)

Procedure

1. Conditions when the malfunction occurred.

- If the rear wheel locks intermittently due to rapid down shifting or due to engine braking on a slippery road surface, DTC No. ABS_42 and ABS_47 may be indicated.

2. Incorrect installation of the rear wheel sensor (DTC No. 42).

- Check the components for looseness, distortion, and bends.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-22.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Repair or replace the defective part.

3. Incorrect rotation of the rear wheel.

- Check that there is no brake disc drag on the wheel and make sure that it rotates smoothly.

Refer to "CHECKING THE REAR WHEEL" on page 4-21 and "CHECKING THE REAR BRAKE DISC" on page 4-44.

Is check result OK?**YES**

→ Go to step 4.

NO

→ Repair or replace the defective part.

4. Rear brake dragging.

- Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake pedal is operated and that the pressure decreases when the pedal is released.

Refer to "CHECKING THE REAR BRAKE DISC" on page 4-44.

Is check result OK?**YES**

→ Go to step 5.

NO

→ Repair or replace the defective part.

5. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

EAS20768

43_ABS

EAS33484

TROUBLESHOOTING**Item**

Front wheel sensor (missing pulses)

Procedure

1. Foreign material adhered around the front wheel sensor.

- Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the front wheel.

- Check the components for looseness, distortion, and bends.

Refer to "CHECKING THE FRONT WHEEL" on page 4-13.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Replace the wheel axle, tire, front wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

Is check result OK?**YES**

→ Go to step 4.

NO

→ Replace the sensor rotor.

4. Defective front wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

Is check result OK?**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Replace the wheel sensor.

EAS20747

44_ABS

EAS33452

TROUBLESHOOTING**Item**

Rear wheel sensor (missing pulses)

Procedure

1. Foreign material adhered around the rear wheel sensor.

- Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles.

Is check result OK?**YES**

→ Go to step 2.

NO

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the rear wheel.

- Check the components for looseness, distortion, and bends.

Refer to "CHECKING THE REAR WHEEL" on page 4-21.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Replace the wheel axle, tire, rear wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-22.

Is check result OK?**YES**

→ Go to step 4.

NO

→ Replace the sensor rotor.

4. Defective rear wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-22.

Is check result OK?**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Replace the wheel sensor.

EAS20766

51, 52_ABS

EAS33326

TROUBLESHOOTING**Item**

- Vehicle system power supply (voltage of ABS ECU power supply is high) (for DTC No. 51)
- Vehicle system power supply (voltage of wheel sensor power supply is high) (for DTC No. 52)

Procedure**1. Defective battery.**

- Recharge or replace the battery, and check again.
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.

2. Disconnected battery terminal.

- Check the connection.

Is check result OK?**YES**

→ Go to step 3.

NO

→ Replace or reconnect the terminal.

3. Defective charging system.

- Check the charging system.
Refer to "CHARGING SYSTEM" on page 8-12.

Is check result OK?**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Confirm the cause of the problem and repair it, and check again.

EAS20888

53_ABS

EAS33327

TROUBLESHOOTING**Item**

Vehicle system power supply (voltage of ABS ECU power supply is low)

Procedure

1. Defective battery.

- Recharge or replace the battery, and check again.

Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.

2. Defective coupler between the battery and the hydraulic unit assembly.

- Check the coupler for any pins that may be pulled out.
- Check the locking condition of the coupler.

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Is check result OK?**YES**

→ Go to step 3.

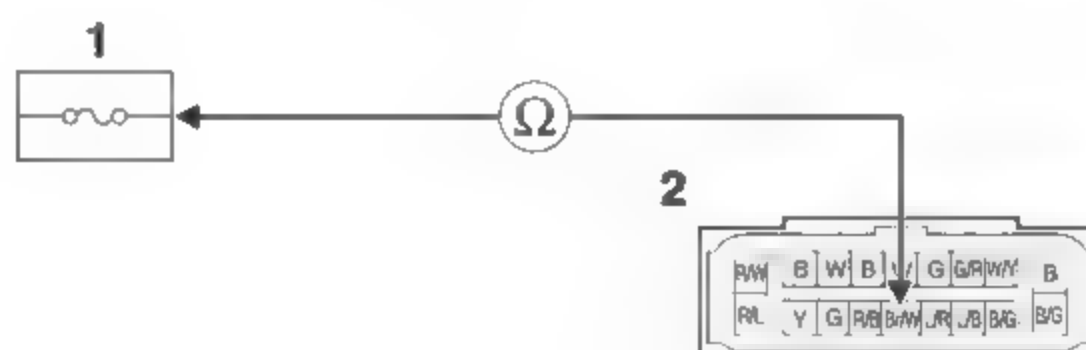
NO

→ Connect the coupler securely or replace the wire harness.

3. Wire harness continuity.

- Disconnect the ABS control unit fuse "1" and ABS ECU coupler "2".
- Open circuit check

Between ABS control unit fuse holder and ABS ECU coupler	brown/white–brown/white
----------------------------------------------------------	-------------------------

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.

Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

Ground short circuit check "A"

Between ABS ECU coupler "1" and ground

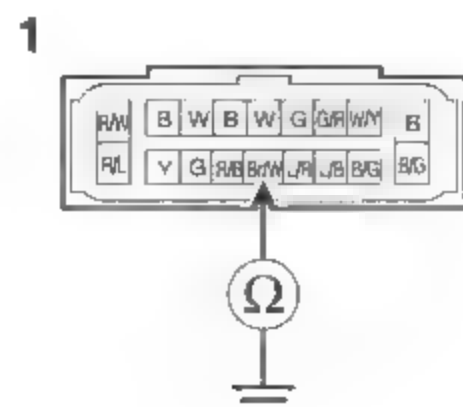
brown/white-ground

Lines short circuit check "B"

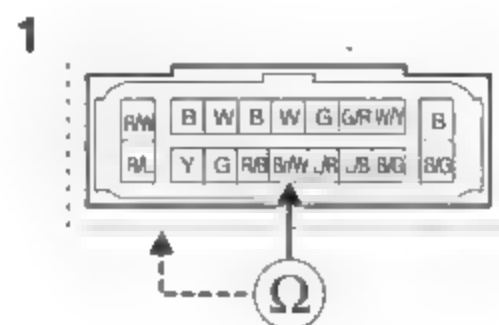
ABS ECU coupler

brown/white-any other coupler terminal

A



B

Is resistance $\infty \Omega$?**YES**

→ Go to step 4.

NO

→ Replace the wire harness.

4. Defective charging system.

- Check the charging system.

Refer to "CHARGING SYSTEM" on page 8-12.

Is check result OK?

YES

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Confirm the cause of the problem and repair it, and check again.

EAS20711

54_ABS

EAS3375

TROUBLESHOOTING**Item**

Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)

Procedure**1. Defective battery.**

- Recharge or replace the battery, and check again.

Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.

2. Defective coupler between the battery and the hydraulic unit assembly.

- Check the coupler for any pins that may be pulled out.
- Check the locking condition of the coupler.

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Is check result OK?**YES**

→ Go to step 3.

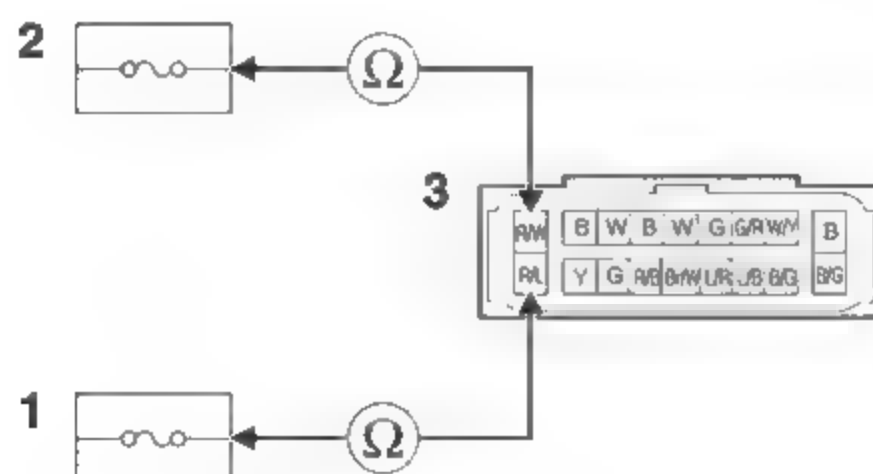
NO

→ Connect the coupler securely or replace the wire harness.

3. Wire harness continuity.

- Disconnect the ABS motor fuse "1", ABS solenoid fuse "2" and ABS ECU coupler "3".
- Open circuit check

Between ABS motor fuse holder and ABS ECU coupler	red/blue-red/blue
Between ABS solenoid fuse holder and ABS ECU coupler	red/white-red/white

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

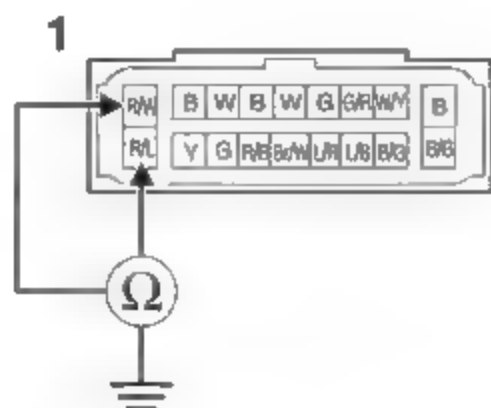
Ground short circuit check "A"

Between ABS ECU coupler "1" and ground	red/blue-ground red/white-ground
----------------------------------------	-------------------------------------

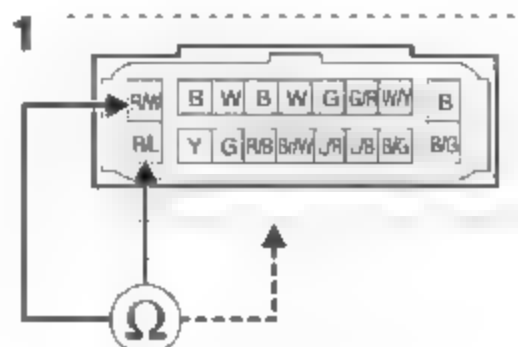
Lines short circuit check "B"

ABS ECU coupler	red/blue-any other coupler terminal red/white-any other coupler terminal
-----------------	-----------------------------------------------------------------------------

A



B

Is resistance $\infty \Omega$?**YES**

→ Go to step 4.

NO

→ Replace the wire harness.

4. Defective charging system.

- Check the charging system.

Refer to "CHARGING SYSTEM" on page 8-12.

Is check result OK?

YES

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Confirm the cause of the problem and repair it, and check again.

EAS20701

56_ABS

EAS33329

TROUBLESHOOTING**Item**

Hydraulic unit assembly (abnormal internal power supply)

Procedure

1. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-49.

EAS20708

63_ABS

EAS3334

TROUBLESHOOTING**Item**

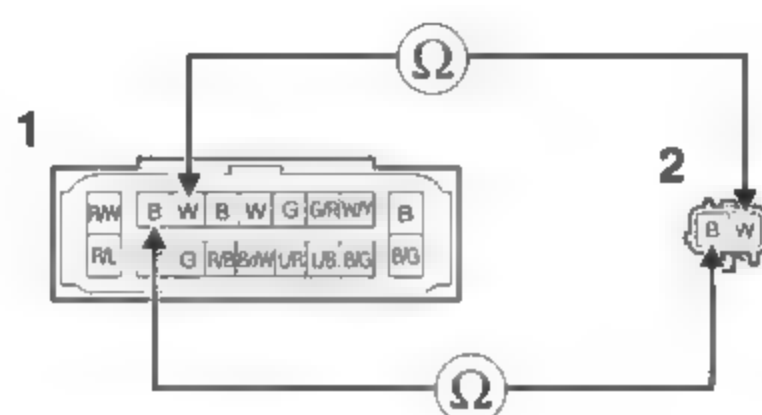
Front wheel sensor power supply (voltage of power supply is low)

Procedure

1. Wire harness continuity.

- Disconnect the ABS ECU coupler "1" and front wheel sensor coupler "2".
- Open circuit check

Between front wheel sensor coupler and ABS ECU coupler	white—white black—black
--------------------------------------------------------	----------------------------

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

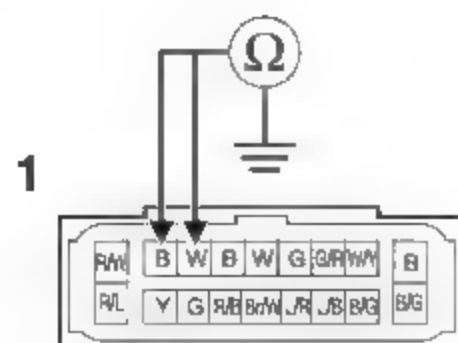
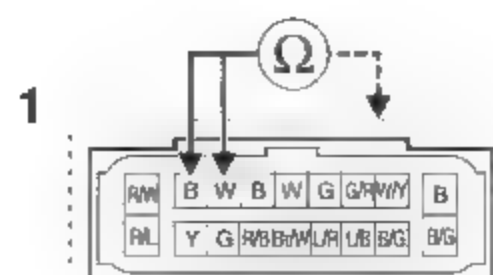
Disconnect the ABS ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

Ground short circuit check "A"

Between ABS ECU coupler "1" and ground	white—ground black—ground
----------------------------------------	------------------------------

Lines short circuit check "B"

ABS ECU coupler	white—any other coupler terminal black—any other coupler terminal
-----------------	----------------------------------------------------------------------

A**B**

Is resistance $\infty \Omega$?

YES

→ Go to step 2.

NO

→ Replace the wire harness.

2. Defective front wheel sensor.

- Replace the front wheel sensor.

3. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-49.

EAS20704

64_ABS

EAS3335

TROUBLESHOOTING**Item**

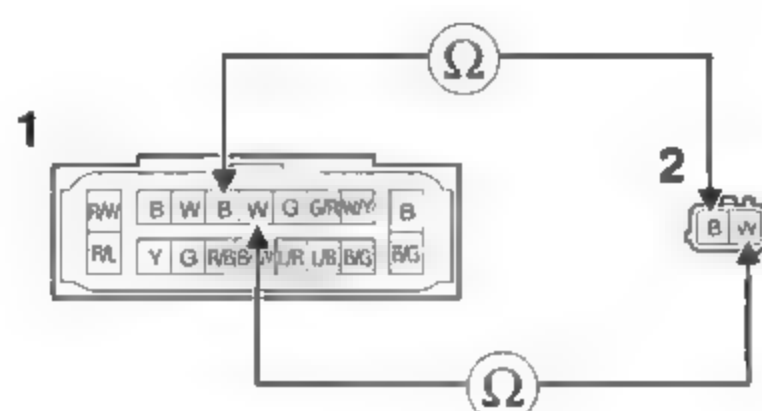
Rear wheel sensor power supply (voltage of power supply is low)

Procedure

1. Wire harness continuity.

- Disconnect the ABS ECU coupler "1" and rear wheel sensor coupler "2".
- Open circuit check

Between rear wheel sensor coupler and ABS ECU coupler	white—white black—black
-------------------------------------------------------	----------------------------

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

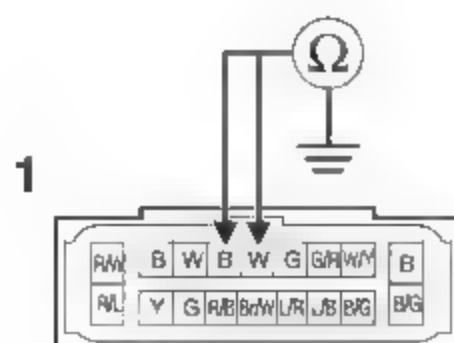
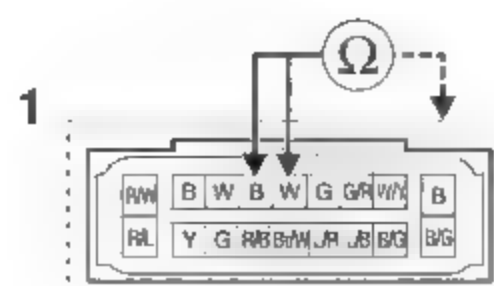
Disconnect the ABS ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

Ground short circuit check "A"

Between ABS ECU coupler "1" and ground	white—ground black—ground
----------------------------------------	------------------------------

Lines short circuit check "B"

ABS ECU coupler	white—any other coupler terminal black—any other coupler terminal
-----------------	----------------------------------------------------------------------

A**B**

Is resistance $\infty \Omega$?

YES

→ Go to step 2.

NO

→ Replace the wire harness.

2. Defective rear wheel sensor.

- Replace the rear wheel sensor.

3. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-49.

EAS20669

89_ABS

EAS3289

TROUBLESHOOTING**Item**

CAN communication (between meter assembly and hydraulic unit assembly)

Procedure

1. Defective coupler between the meter assembly and the hydraulic unit assembly

- Check the coupler for any pins that may be pulled out.
- Check the locking condition of the coupler.

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Is check result OK?**YES**

→ Go to step 2.

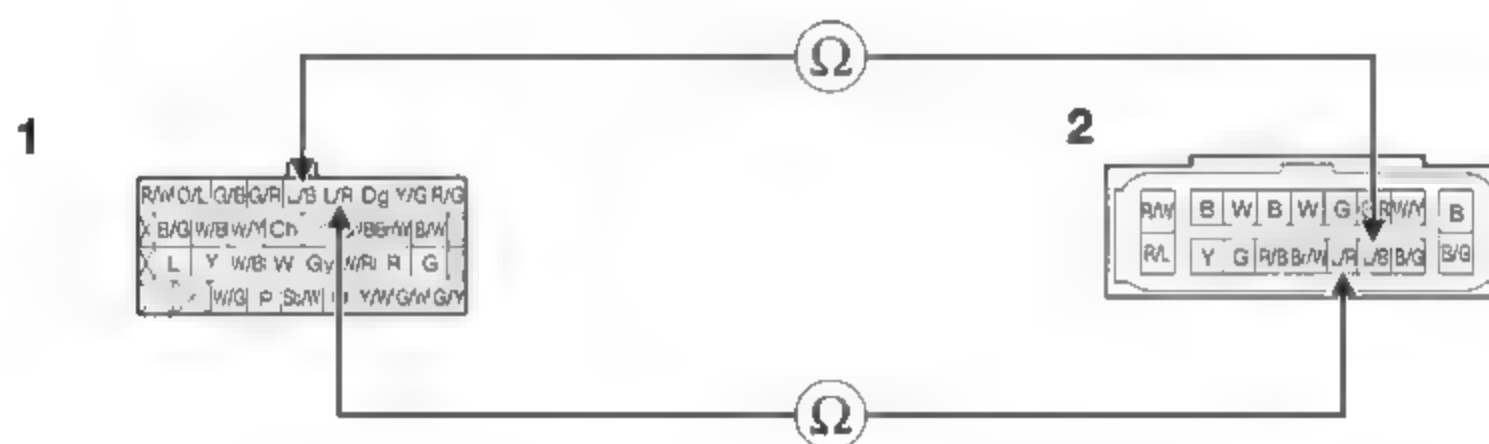
NO

→ Connect the coupler securely or replace the wire harness.

2. Wire harness continuity.

- Disconnect the meter assembly coupler "1" and ABS ECU coupler "2".
- Open circuit check

Between meter assembly coupler "1" and ABS ECU coupler "2"	blue/black-blue/black blue/red-blue/red
------------------------------------------------------------	--------------------------------------------

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

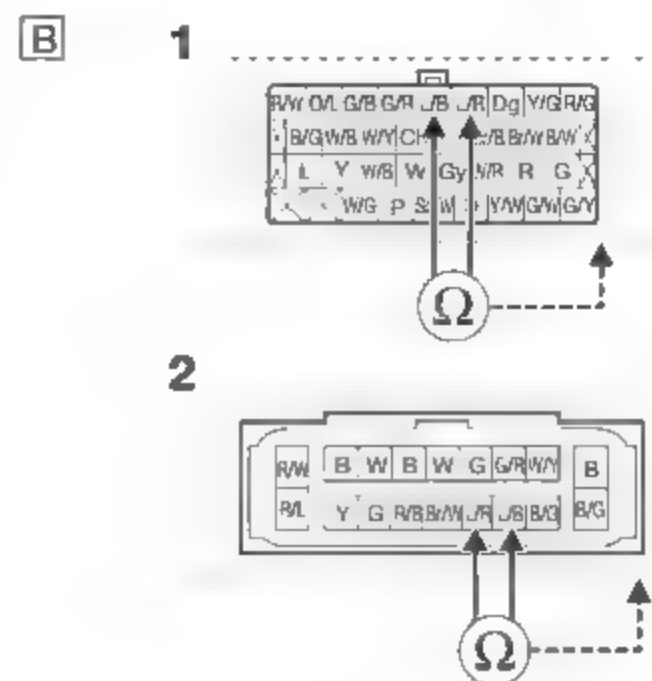
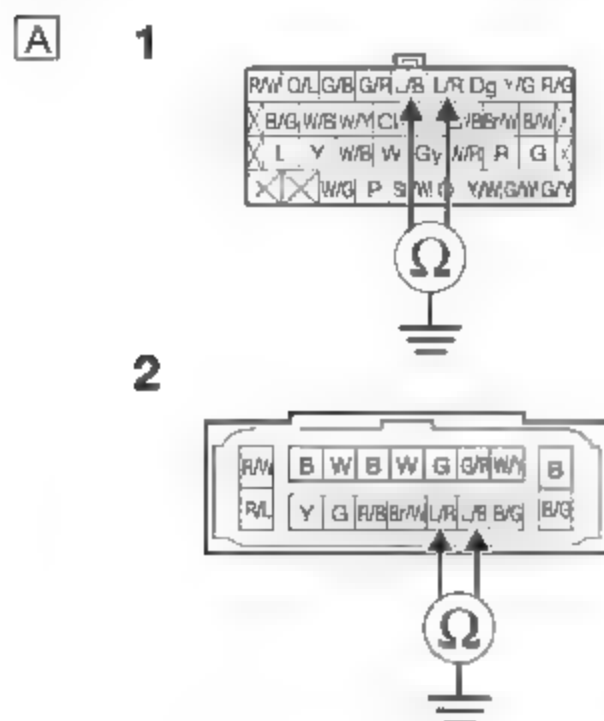
Disconnect the ABS ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

Ground short circuit check "A"

Between meter assembly coupler "1" and ground	blue/red-ground blue/black-ground
Between ABS ECU coupler "2" and ground	blue/red-ground blue/black-ground

Lines short circuit check "B"

Meter assembly coupler	blue/red—any other coupler terminal blue/black—any other coupler terminal
ABS ECU coupler	blue/red—any other coupler terminal blue/black—any other coupler terminal



Is resistance $\infty \Omega$?

YES

→ Go to step 3.

NO

→ Replace the wire harness.

3. Defective meter assembly

- Replace the meter assembly, and check again.

4. Defective hydraulic unit assembly

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

EAS20870

90_ABS

EAS33300

TROUBLESHOOTING**Item**

CAN communication (between ECU and hydraulic unit assembly)

Procedure

1. Defective coupler between the ECU and the hydraulic unit assembly

- Check the coupler for any pins that may be pulled out.
- Check the locking condition of the coupler.

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Is check result OK?**YES**

→ Go to step 2.

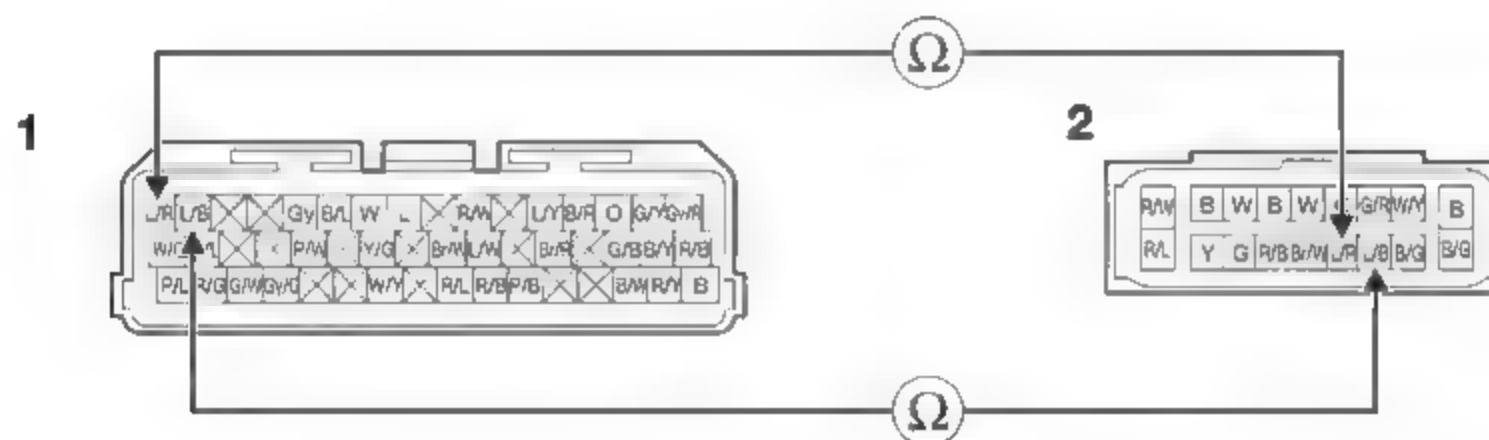
NO

→ Connect the coupler securely or replace the wire harness.

2. Wire harness continuity.

- Disconnect the ECU coupler "1" and ABS ECU coupler "2".
- Open circuit check

Between ECU coupler "1" and ABS ECU coupler "2"	blue/black–blue/black blue/red–blue/red
-------------------------------------------------	--------------------------------------------

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ECU and ABS ECU related connectors before checking.

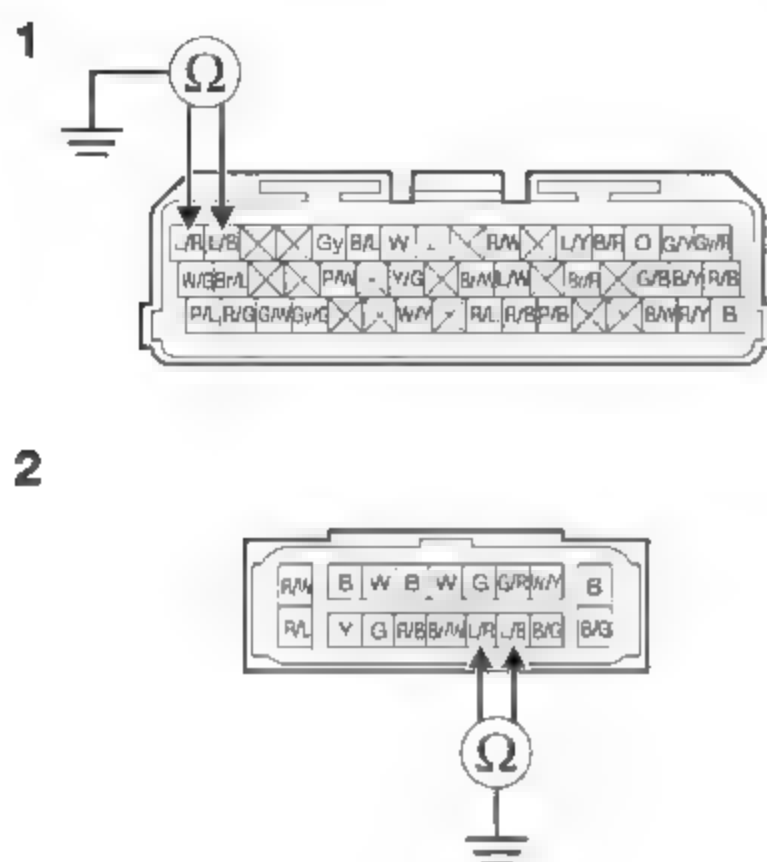
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3 and "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

Ground short circuit check "A"

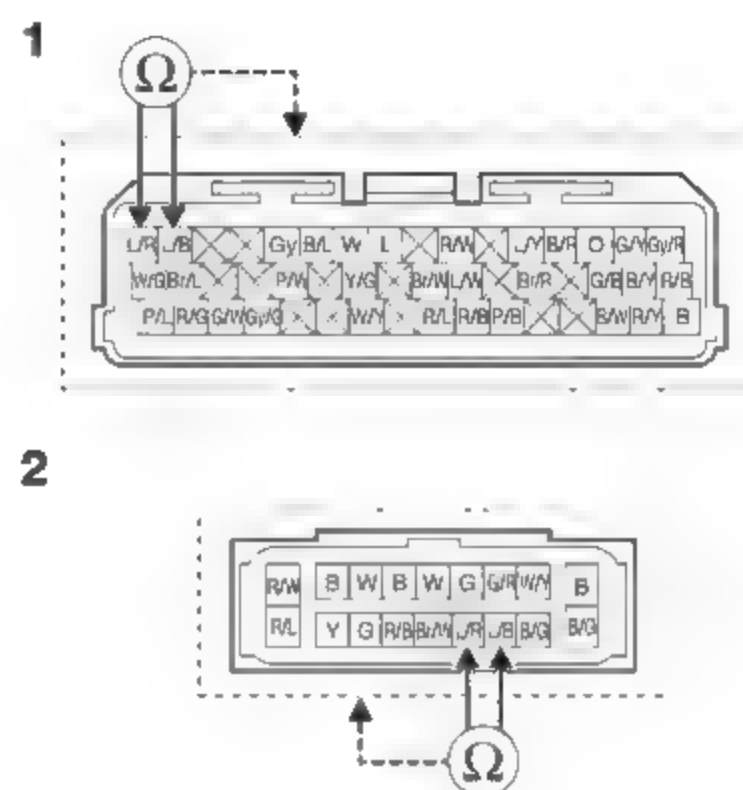
Between ECU coupler "1" and ground	blue/red–ground blue/black–ground
------------------------------------	--------------------------------------

Between ABS ECU coupler "2" and ground	blue/red-ground blue/black-ground
Lines short circuit check "B"	
ECU coupler	blue/red-any other coupler terminal blue/black-any other coupler terminal
ABS ECU coupler	blue/red-any other coupler terminal blue/black-any other coupler terminal

A



B

Is resistance $\infty \Omega$?**YES**

→ Go to step 3.

NO

→ Replace the wire harness.

3. Defective ECU

- Replace the ECU, and check again.

4. Defective hydraulic unit assembly

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-49.

WIRING DIAGRAM**XTZ7R 2024**

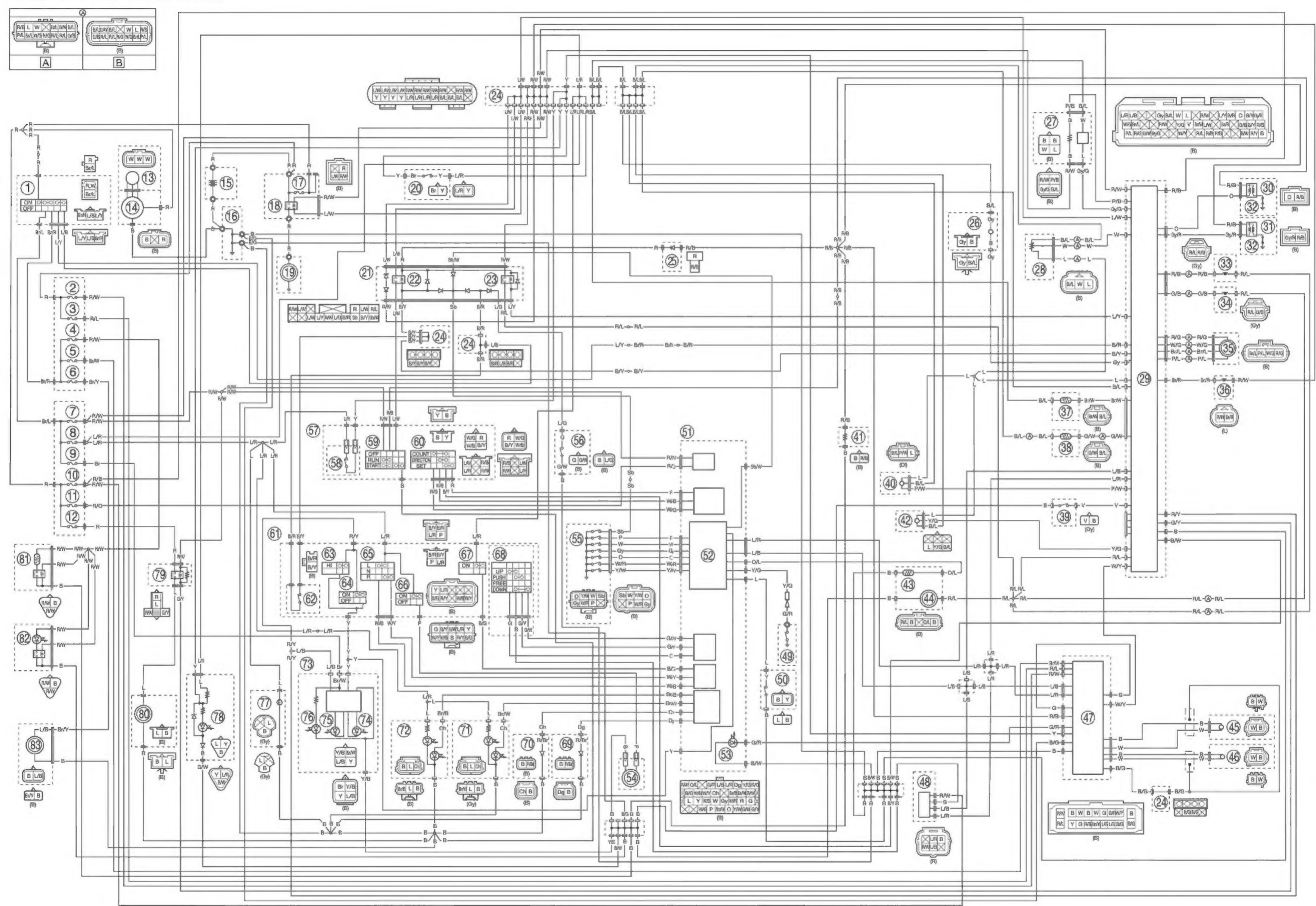
1. Main switch
2. ABS solenoid fuse
3. ABS motor fuse
4. Accessory fuse
5. ABS control unit fuse
6. Auxiliary fuse
7. Ignition fuse
8. Signaling system fuse
9. Headlight fuse
10. Fuel injection system fuse
11. Backup fuse
12. Radiator fan motor fuse
13. Stator coil
14. Rectifier/regulator
15. Battery
16. Engine ground
17. Main fuse
18. Starter relay
19. Starter motor
20. Rear brake light switch
21. Relay unit (diode)
22. Starting circuit cut-off relay
23. Fuel pump relay
24. Joint coupler
25. Diode
26. Crankshaft position sensor
27. O₂ sensor
28. Throttle position sensor
29. ECU (Engine Control Unit)
30. Ignition coil #1
31. Ignition coil #2
32. Spark plug
33. Fuel injector #1
34. Fuel injector #2
35. ISC (Idle Speed Control) unit
36. Purge cut valve solenoid
37. Intake air temperature sensor
38. Coolant temperature sensor
39. Shift sensor (OPTION)
40. Intake air pressure sensor
41. Resistor unit
42. Lean angle sensor
43. Fuel sender
44. Fuel pump
45. Front wheel sensor
46. Rear wheel sensor
47. ABS ECU
48. YDT coupler
49. Oil pressure switch
50. "ABS ON" button
51. Meter assembly
52. Multi-function meter
53. ABS warning light
54. Horn
55. Gear position switch
56. Sidestand switch
57. Handlebar switch (right)

58. Front brake light switch
59. Stop/run/start switch
60. Wheel switch
61. Handlebar switch (left)
62. Clutch switch
63. Dimmer switch
64. Pass switch
65. Turn signal switch
66. Horn switch
67. Hazard switch
68. Mode switch (OPTION)
69. Rear turn signal light (right)
70. Rear turn signal light (left)
71. Front turn signal/position light (right)
72. Front turn signal/position light (left)
73. Headlight assembly
74. Headlight (high beam)
75. Headlight (low beam)
76. Auxiliary light
77. License plate light
78. Tail/brake light
79. Radiator fan motor relay
80. Radiator fan motor
81. Grip warmer (OPTION)
82. Fog light (OPTION)
83. USB jack
- A. Wire harness
- B. Sub-wire harness

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
Br/Y	Brown/Yellow
G/B	Green/Black
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/G	Gray/Green
Gy/R	Gray/Red
L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
P/B	Pink/Black
P/L	Pink/Blue
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
Sb/W	Sky blue/White
W/G	White/Green
W/R	White/Red
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/W	Yellow/White

XTZ7R 2024 WIRING DIAGRAM



XTZ7R 2024 WIRING DIAGRAM

